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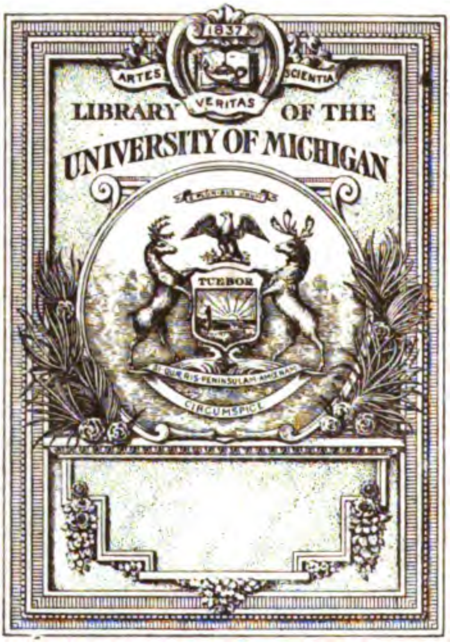
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LONDON JOURNAL

OF

Arts, Sciences, and Manufactures,

AND

REPERTORY

OF

PATENT INVENTIONS.

CONDUCTED BY

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OF THE OFFICE FOR PATENTS, CHANCERY LANE.

(Assisted by several Scientific Gentlemen.)

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I. Schenck's Machinery for Dressing Flax; Dickenson and Falkous' Gas-Meter; Johnson's Lifting Appts.; and Bayley's Impd. Spindle.

II. Farthing's Appts. for Manufacturing Glass; Denton's Presser-Flyer; and Fairbairn's Impts. in Beams for Bridges, Buildings, &c.

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No. CLXXXVIII.

RECENT PATENTS.

To Robert Brett Schenck, *late of the city of New York, in the United States of America, but now residing at Fitzroy-square, in the county of Middlesex, Gent., for an invention of certain improvements in the preparation of hemp and flax,—being a communication.*—[Sealed 17th November, 1846.]

This invention of improvements in the preparation of hemp and flax consists in subjecting such fibrous materials to a series of processes, whereby the fibres fit for spinning may be separated from the woody portions of the plants, and rendered fit to undergo the heckling or combing process. That part of the process of preparing hemp and flax to which the invention refers may be thus defined:—First, the patentee proposes to take the flax or hemp (the operation for both plants being precisely similar) as it is brought from the field, and at once submit it to a novel process of water-retting, in order to destroy the resin or gummy matter contained in the plant, and allow the fibres to be readily separated.

When the flax is brought to this state it is next submitted to a machine of a new construction, wherein the woody portions are broken away and separated from the useful fibres. And, to complete the contemplated operations, the flax is lastly submitted to a machine, whereby the fibres are more minutely divided, and the short fibres or tow, the dust, and other extraneous matters contained in the flax, are removed.

The improvements connected with the first or retting process comprise the application of chemical means, governed in their operation by mechanical arrangements, whereby the resinous or glutinous matter which attaches the "rhind" or fibres to the stem of the rough plants is dissolved, and the cohesion of the fibres to the wood or stem is destroyed. This is effected in a short time, at a small cost, and at all seasons of the year, without loss of the useful parts by putrefaction on the one hand, or by an incomplete abstraction of the fibre from the woody matter on the other; and also without breakage of the fibre or any injury to the natural strength of the plant. As the technical term "lint" is commonly applied to the fibrous portions of rough hemp and flax, and the term "boon" is usually applied to the woody part of the stem, these terms will be so used in the subsequent description.

The second part of the invention comprises a new arrangement of mechanical means, by which the boon is broken up and most effectively separated from the lint without breaking or wasting the fibre, and in such a manner that far less time and labor is needed in the operation than by any other known process.

The third part of the process comprises an arrangement of peculiarly-formed rotating beaters, in connection with a fan or blower, by means of which the operation technically known as "scutching" is performed, and the material is delivered in a fit state for the market.

In Plate I., fig. 1, represents, in plan view, a wooden vat or vessel, which may be of any convenient size; but is proportioned as about 90 feet long, 10½ feet wide, and about 5 feet deep: this vat may, for convenience, be sunk in the earth to nearly its whole depth, if it can be readily emptied at such a level. Fig. 2, is a side elevation of the framing employed in connection with the vat; and fig. 3, is an end elevation of the same. *a, a,* are the cross timber sleepers, forming the lower foundation of the vat; *b, b,* are posts, dovetailed or otherwise secured at their lower ends to the timbers *a, a.* About every third post is made from ¼ to ⅛ longer than the others, to receive a set of cross-ties *c, c,* on its upper end, to keep the sides of the vat from bulging out: these cross-ties may serve also to support a light roof, if deemed needful. When thus fitted, the bottom, sides, and ends of the tank are to be well planked and caulked inside the timbers, up to the height of the longitudinal bars *d;* which bars project within the vat, over the planking, for a use hereafter mentioned. *i, i,* is a horizontal water-pipe, having holes or perforations on each side to allow of the exit of water supplied to the pipe by the descending vertical pipe *j,* connected with one or more cisterns, set at a sufficient height for the water to descend into and fill the vat. A pipe and branch, in connection with a boiler, conducts steam into a metal pipe *g, g,* laid along the bottom of the vat, from the point *h,* to the other end, and returning by an elbow to form two parallel lengths. This pipe is laid on a gentle slope from the part *h,* to allow the water of condensation to run off at the other or open end. Above the pipes *g,* and *i,* a wooden platform, perforated with a number of holes, is to be placed, leaving a small space between the under side of the platform and the upper side of the pipe *i,* so that the perforations of that pipe shall allow of the water, which enters it through the pipe *j,* to flow freely into the vat; which water, when the operation of retting is completed, is to be drawn off by a sluice-gate *l,* made in the end of the vat for that purpose. When thus provided, the vat is ready to receive the rough plants of hemp or flax, which are placed on the perforated platform, and piled up to about the height of the longitudinal bars *d;* the long timbers *e, e,* (fig. 3,) are then to be laid on the rough plants lengthways of the vat, and the timbers *f, f,* are placed across them; the upper part of each end being inserted beneath the lower edges of the bars *d, d.* The object of this framing is to keep the plants from rising as they swell and enlarge from fermentation, while the retting process is being accomplished. It will be clearly understood that the expansion of the retting mass of plants beneath being very great, when they absorb the retting-water, the framing would be liable to break up unless strongly made. It may be proper here to notice, that wood without any coloring matter is preferable to other wood, or to iron, for the material of the vat, because colored wood or iron will be acted on by the acetous fermentation, next to be described, and discolor the fibres of the hemp or flax.

The mode of operation is as follows:—The hemp or flax being laid in the vat, water is admitted, which, descending through the pipe *j*, passes into the horizontal pipe *i*, and thence through its perforations into the space beneath the platform. When this space is filled, the water will rise through the perforations in the platform, and become equally distributed among and over the mass of plants in the vat. The supply of water is to be renewed as it becomes absorbed by the plants, or is lost by evaporation, in order to keep the plants covered. Steam is now to be admitted by the valve *h*, before referred to, and made to circulate in the pipe *g*, *g*, so as to raise the water, previously admitted amongst the plants, to about 90° of Fahr., and maintain it at a uniform heat. The water, when heated, immediately begins to dissolve the resinous and glutinous mucilage, which attaches the lint to the boon, and within a few hours the acetous fermentation will commence; this fermentation speedily decomposes the resinous matter, and abstracts the color from the lint and boon, leaving them in a state to be readily separated from each other.

After the flax has remained in the vat from two and a half to three days, the water, surcharged with the mucilage, is drawn off by the sluice-gate *l*, and the retted plants are taken out, and are either dried in the sun or by artificial means; the vat may then be re-charged with other plants, to be operated upon in the same manner.

The machine employed for operating upon the flax or hemp, after it has undergone the preparatory process of water-retting, is represented at figs. 4, 5, and 6; fig. 4, being a side elevation of the machine; fig. 5, a plan view of the same; and fig. 6, a sectional elevation, taken through about the middle of the machine. *a, a,* is the main framing, for supporting the various parts of the machine; *b,* is the driving-shaft, which receives motion from any first mover; and by means of its pinions *c, d,* and *d**, communicates the same to the moving parts of the machine. The pinion *c,* gears into a pinion *e,* mounted on a short shaft, which has its bearings in the curved bars *f, f,* bolted to the top of the main framing of the machine. Upon the same shaft as that of the pinion *e,* is a pinion *g,* which communicates motion to a series of pinions *h, i, k,* mounted also on short shafts, having their bearings on the bars *f, f.* At each end of these several shafts a disc *l,* is keyed; and these discs are provided with adjustable studs, to carry the pendant arms *m,* which are attached together at their lower ends in pairs, by a coupling-rod *n,* as shewn in the detached view at fig. 7. These rods *n,* have eyes formed in them, to allow of a cylindrical guide *o,* passing through them. Of these guides there are four pairs, one for each pair of pendant arms; and they are affixed by nuts, capable of adjustment, to curved slotted bars *p, p,* which are bolted to the main framing.

Immediately below the pendant arms is a rotary drum, mounted on a shaft *q,* which has its bearings on the main framing. This drum is provided, at its periphery, with radiating blades *r, r,* for the purpose to be hereafter explained. *s, s,* are horizontal blades or beaters, attached to the lower end of the pendant arms *m*; and by the rotation of the discs *l,* (which act as cranks) have an up and down motion communicated to them; which motion is so timed, with regard to the rotation of the drum, as to allow of the blades or beaters *s,* coming down suddenly into the space between the blades *r,* and rising quickly to permit the continuous rotation of the drum. *t, t^1,* are two pairs of feeding-rollers, which receive the flax or hemp, to be acted upon, from an endless travelling apron *u, u.* These rollers are weighted, as shewn in the drawing, by a double lever attached to the framing; but it is obvious that any other convenient mode may be employed. Rotary motion is communicated to these parts in the following manner:—On the driving-pulley side of the machine (see the plan view, fig. 5,) a wheel *v,* is mounted on a stud, projecting from the framing;—this wheel *v,* gears into the wheel d, on the main driving-shaft; and being also in gear with a wheel w, keyed on to a shaft x, rotary motion is communicated to that shaft, which, having on its other end a pinion y, gearing into a large cog-wheel z, rotary motion is transmitted thereto. On the shaft of the wheel z, a pinion 1, is mounted, which gears into a cog-wheel 2, mounted on the axle of the lower roller of the pair of feeding-rollers t^1. This same axle also carries a pinion 5, (see fig. 3,) for actuating the travelling-apron and the feed-rollers. The rotation of this pinion drives a pinion 6, in gear with a pinion 7, which is mounted on the shaft of the inner roller of the endless travelling-apron, and thus causes the apron to feed in the flax or hemp to the machine. The pinion 5, also takes into a pinion 8, in gear with a pinion 9, on the axle of the lower roller of the second pair of rollers t; and the top feeding-rollers are each provided with a pinion, which takes into its respective pinion on the lower rollers, whereby they are made to turn in a reverse direction, and carry the flax or hemp forward into the machine to be acted upon by the knives or beaters. 10, is a cog-wheel, mounted on the drum-shaft q, and receives rotary motion from a pinion 11, mounted on a short stud, supported by the main framing. This stud also carries a cog-wheel 12, which is brought into gear with the pinion d^*, on the driving-shaft b, and thereby communicates rotary motion to the drum which carries the blades r. In this machine the blades r, on the drum q, and the beaters s, have all smooth square edges, and the peripheries of the feed-rollers t, are cylindrical. The action of the machine is as follows:—Rotary motion being communicated to the driving-shaft b, the requisite movements are transmitted, by the gearing above described, to the various parts of the machine; and the flax or hemp being laid lengthways upon the apron u; is carried forward to the feed-rollers t^1, which take it up and conduct it to the other pair of rollers t. In passing between these two pairs of rollers the flax is partially crushed and brought to a thin sheet; in which state it is received on to the blades r, of the rotating drum, and carried under the beaters s. These beaters being made to rise and fall by the excentric motion of the studs, which attach the upper ends of the pendant arms *m*, to the rotating discs *l*, will beat the flax against the edges of the blades *r*, and break up the boon or woody portion of the plant, and completely loosen it from the useful fibres. The flax, after it has passed under the action of all the beaters, is then taken off the drum by hand, and submitted to the operation of the scutcher, which constitutes the third head of the invention.

This machine is intended to effect the operation commonly termed "scutching" the flax, after the boon has been broken up and beaten out by the machine above described. Fig. 8, is a longitudinal sectional elevation of the scutching-machine. A, A, is the ground-framing; B, B, vertical supports; and C, C, the cross-ties, together composing the frame on which the working parts are mounted. Motive power is communicated to the driving-shaft E, by a band and pulley, from any first mover. Upon this shaft, and near each end thereof, four metal arms F, F, are keyed, for the purpose of carrying four beaters G, G. These beaters G, G, are formed as shewn in the detached view, fig. 9; the outer edge, or that which comes in contact with the flax, being serrated; and on its flat or inner face the beater is provided with a series of teeth, so set in casting the bars, that the two half divisions form respectively a portion of a right and left-handed helix, each converging to the centre of the machine—a right-angled flanch, at each end of the bars G, enters an opening in the ends of the arms F, to which they are bolted. H, H, are short drums, secured to the arms F, at each end of the beaters, and are so made that they closely overlap, but do not touch, a drum or ring, affixed by flanches to the side-frames B, B. These drums together prevent the access of any dust from the hemp or flax to the journal-boxes of the shaft E. The space within the beaters is enclosed by a square wooden box K, K, which is supported at its angles by the bars F, and is intended to prevent the access of any loose lint or tow to the shaft E, or to its journals. L, is a horse or rest, over which the hemp or flax, to be operated upon, is laid.

Beyond the beaters is a trunk M, the outer end of which is supported by a small frame, and its inner end is brought into close connection with the framing of the beater. This trunk is intended to pass out the tow, with the dust or waste abstracted from the hemp or flax by the action of the beaters. The dust or waste falls through a grating N, formed lengthwise at the bottom of the trunk; and the tow is to be arrested upon and taken off the elevated part of this grating, which projects beyond the trunk M. To accelerate this part of the operation a pulley is fitted on one end of the shaft E, and from it a band passes over a pulley, on a shaft D, set in journals and boxes on the sides of the trunk. The shaft D, carries within the trunk M, a fan or blower O, rather more than half the diameter of the circle formed by the rotation of the beaters, and driven at about four times the speed of the beaters. This quick rotation of the fan is intended to create a rapid indraft of air between the beaters, by which means the tow, dust, and waste, separated by the beaters from the material under operation, are driven forward into the trunk M, where, as before stated, the dust falls through the grating N, and the tow is carried up the incline of the grating to be taken off by hand. The mode of operating the machine is as follows:—The workman takes a strick of hemp or flax by one end in his hands, and lays the loose ends over the horse L; these are at once operated upon by the beaters, and the lint or fibres are so separated by the serrated edge and helical teeth of the beaters that all the small chips or broken pieces of the boon are beaten out, and likewise the short fibres of tow, with the waste and dust, are removed therefrom. The workman then "turns ends" with the strick of flax to finish the other part of the strick in the same manner; and the operation is then completed, leaving the long staple fibres in a marketable condition, and fit for the operation of the heckling-machine.

If it is desired to clean and comb the tow or waste abstracted from the stricks of flax or hemp by this operation, the mode of fitting the blower, shewn in figs. 10, and 11, may be successfully adopted. In this arrangement the bars of the grating N, and the edges of the blower fans are fitted with spike-formed teeth, arranged so that those on the blower will pass between the teeth on the grating. By this means the tow, while passing from the beaters, will be combed and cleaned, and the centrifugal force of the blast from the blower will prevent any adhesion of the tow to the blower teeth.

The patentee states, in conclusion, that he does not intend to claim the exclusive use of hot water, however it may be employed in dissolving the resinous or gummy particles of hemp and flax, as many attempts have been made with heated solutions of alkali and of acid to effect the same purpose, and with various results; but he claims the application of hot water (without any chemical ingredients), maintained at a uniform or nearly uniform heat, for steeping hemp and flax, whereby acetous fermentation, which destroys the adherence of the fibres of such plants, is quickly induced; and thus the time required for the retting process is considerably shortened; the fœtid smell arising from the partial decay of the plants, as is ordinarily the case, is prevented; and the fibres of the plants, not being subject to discoloration or decay, are obtained of a better quality, both as to strength and color. He also claims the arrangement of the apparatus employed for effecting the retting process, as above described. Secondly,—the general arrangement of the machinery for breaking the boon or woody portion of the flax and hemp plants from the useful fibres. And particularly the employment of the sliding beaters, in connection with fixed blades attached to a rotating drum, as represented in the drawings. Thirdly,—the scutching machine, as exhibited in the drawings, whereby the tow and dust is separated from the fine fibres of the plants. And Lastly,—the mode of combing the tow, when beaten or drawn out from the finer fibres of hemp and flax, as also shewn in the drawings.—[*Inrolled in the Petty Bag Office, May,* 1847.]

Specification drawn by Messrs. Newton and Son.

To William Fairbairn, *of Manchester, in the county of Lancaster, civil engineer, for improvements in the construction of iron beams for the erection of bridges and other structures.*—[Sealed 8th October, 1846.]

This invention of improvements in the construction of iron beams for the erection of bridges and other structures consists in the novel application and use of plates of metal, united by means of rivets and angle-iron, for such or similar purposes; and forming by such combination a hollow iron beam or girder.

In Plate II., fig. 1, represents a side elevation of part of a hollow iron beam or girder; and fig. 2, a transverse section of the same, shewing its mode of construction. *a*, *a*, are the side-plates; *b*, *b*, the bottom plates; *c*, *c*, the interior vertical angle or T-iron for connecting the plates *a*, *a*, by means of the covering plates or irons *d*, *d*, and the rivets *e*, *e*: these side-plates are all to be put together with butt-joints, and rivetted, either by machinery or by hand, in a similar manner to ordinary boiler-making. The top of this hollow beam or girder is formed of two or more rectangular cells or hollow chambers, composed of plates *f*, *f*, *f*, and ordinary angle or L-iron *g*, *g*, *g*, being fastened together by the rivets *h*, *h*, *h*, attached to the side-plates *a*, *a*, by the angle-iron *i*, *i*. The bottom of this hollow beam or girder is formed by plates *b*, *b*, *b*, being fastened together by means of the covering-plates *k*, *k*, and rivets *l*, *l*, *l*, and attached to the side-plates by the angle-iron *m*, *m*. The top of the hollow beam or girder is constructed of cast or malleable iron, and of any convenient form, either cellular, rectangular, as shewn in fig. 2, or of an elliptical form, as shewn at fig. 7, (where it is represented of cast-iron) or of any other suitable shape calculated to prevent the top giving way or puckering from compression. Or other variations in the method of constructing the top of the beam may be adopted; namely, either by employing thick metallic plates to form the top, or by lighter iron plates, arranged so as to form hollow cells, as may be most convenient for the purpose of resisting a crushing force and retaining the beam in shape. The bottom of the hollow beam or girder is constructed of a series of plates *b*, *b*, either of a single or double thickness, rivetted together by means of covering-plates *k*, *k*, placed over the butt-joints and rivets *l*, *l*. These plates *b*, *b*, are united to each other by alternating or crossing the joints, and by a peculiar mode of rivetting the same, which is best seen at fig. 8. This novel method of rivetting the patentee terms "chain-rivetting," as it forms an entire chain of plates throughout the structure, and so unites the covering-plates over the joints as not to weaken or injure the plates by transverse rivets, but forms a connecting link to each joint by a series of longitudinal rivets or pins, as shewn at fig. 3. This novel method of rivetting is of importance in retaining the strength of the plates, and greatly contributes to their powers of resistance to a tensile strain.

Fig. 4, represents a side elevation; and fig. 5, a transverse section of part of a hollow iron beam or girder, wherein the sides or plates *a*, *a*, are composed of sheet-iron, and rivetted to the top and bottom plates *b*, *b*, by means of angle-iron *c*, *c*, in the ordinary manner. This construction of hollow beam or girder is intended for the usual purposes of building mills, factories, warehouses, dwelling-houses, &c., whereas those formerly described are more suitable for the erection of bridges, viaducts, and other similar works. Fig. 6, represents a side elevation, and fig. 7, a transverse section of part of a hollow iron beam or girder, constructed in a similar manner to that first described, excepting that, instead of the rectangular plate iron top, this variation has an elliptical or other shaped cast-iron top *f*, *f*, *f*, which is cast in suitable or convenient lengths, and fastened by means of rivets to the side-plates or sheets *a*, *a*; the several lengths or castings being connected together by flanches *g*, *g*, in a similar manner to ordinary water-pipes, and the joints protected by a cap or cover *h*, *h*.

Fig. 8, represents a side elevation of a hollow girder bridge, constructed on the principles of this invention, and shewing the practical application of the hollow iron beam or girder to such or similar purposes; and fig. 9, is a transverse section of the same, taken at the line A, B, in fig. 1. C, C, C, C, are hollow iron beams or girders, forming the sides of the bridge; and D, D, a central hollow beam or girder (nearly double the strength of the sides), all being supported at each end by suitable fastenings, piers, &c. E, E, are hollow iron cross-beams for sustaining the roadway F, F. The girders C, and D, are constructed according to the plan detailed with reference to figs. 1, 2, and 3; and the cross-beam E, is somewhat similar to those at figs. 4, and 5.

The patentee claims the novel application and use of plates or sheets of iron, united by means of angle-iron and rivets, or by other means, for forming or constructing, by such combination, hollow beams or girders, for the erection of bridges and other buildings, whether constructed according to the several figures represented in the drawings and above described, or in any other manner or form embracing the principles of the invention.—[*Inrolled in the Petty Bag Office, April*, 1847.]

Specification drawn by Messrs. Newton and Son.

To Thomas Friend Dickenson, *of the borough and county of Newcastle-upon-Tyne, share-broker, and* John Fellows, *of the same place, gas engineer, for certain improvements in gas-meters.*—[Sealed 15th December, 1846.]

This invention relates to the ordinary construction of wet gas-meters, and consists in certain improvements in the construction of the same, for the purpose of preventing any tampering with the meter, by tilting it, to produce a greater flow of gas through the meter than would be indicated by the index of the meter; the effect of tilting the improved meter is that no gas will then be able to pass through it.

In Plate I., fig. 1, is a front elevation of a gas-meter, constructed according to this invention, shewing part of the interior of the same; fig. 2, is a vertical section through the centre of the same; and fig. 3, is a similar section, shewing the effect of tilting the meter. 1, 2, is the exterior box or case, containing the drum 3, mounted on the horizontal axis 4, on the front end of which is an endless screw, acting on a worm-wheel at the bottom of the upright axis 5. The upper end of the axis 5, is also provided with an endless screw, which gears into the first wheel 6, of the registering apparatus. The front end or plate 2, has a chamber 7, in front of it, divided by a partition 8, 9, 10; the space beneath the lowest part 8, of the partition being for water, which communicates freely with the water in the case 1, 2, through two openings 11, 11, and the space above the partition 8, being for gas; but the latter space is divided into two by the upright part 9, of the partition. There is an exit valve 12, fitted to an opening in the part 10, of the partition, with a float 13, attached thereto, so that when the water is at the proper level, the float will raise the valve in order to allow the gas to pass through the partition 10, on its way to the exit-pipe; but if there is a deficiency of water, the float will descend and close the valve. 14, is an upright pipe, with a screw-stopper at its upper end; through which, when opened, water can be introduced into the space beneath the partition 8, in order to fill the lower part of the case to the required level; but any excess of water will overflow in the manner hereafter explained.

The above parts are much the same as those of ordinary gas-meters; but the following parts, which are marked with letters, are different. *a*, is the gas entrance-pipe, which is brought into communication with the drum 3, by means of an elbow-pipe *b*, attached to the back of the case 1, and protruding through the additional end-plate *c*, of the drum. The upper end of the pipe *b*, rises a little above the level of the water in the case, so as to introduce gas into the space above the water: the pipe *b*, and the manner of introducing it into the space between the additional end *c*, and the real end of the drum, is the same as in common gas-meters, except that by this arrangement it is introduced at the back end of the meter, instead of the front end. *a**, is a continuation of the pipe *a*, which, after descending the back of the case 1, continues at right angles along the bottom and rises up at the front, where a small hole is made in the pipe at *f*. Any excess of water that may be introduced into the case 1, 2, will flow over the upper edge of the pipe *b*, and descend through the same into the pipe *a*, *a**, making its escape at the hole *f*, so as not to stand higher in the pipe *a*, *a**, than the level of the hole *f*, and therefore offering no obstruction to the entrance of the gas from the pipe *a*, into the pipe *b*. But if the meter should be tilted backwards, the water in the case will begin to flow through the pipe *b*, and the escape-hole *f*, being raised, in consequence of the tilting, the water will be retained in the pipe *a*, *a**, at the same elevation as the hole *f*, and will prevent the entrance of gas through the pipe *b*, into the case 1, 2, and consequently the operation of measuring will be suspended so long as the meter remains in that position.

The gas, which during the revolution of the drum 8, is discharged from its several compartments into the upper part of the case 1, 2, passes therefrom through an opening *e*, into the space above the partition 8, and then enters through a protection-valve *i*, into an elbow-pipe *g*, which conducts it into the space above the water in the lower part of the chamber 7. From thence the gas ascends through the valve 12, and passes off through the exit-pipe *j*, which extends over the upper part of the case 1, 2, to the back of the meter; so that both the exit and entrance-pipes for the gas will be at the back of the meter.

If the meter should be tilted forward, as represented at fig. 3, the water in the case 1, 2, will rise in the front part of the meter, within the space beneath the partition 8, 9, 10, and against the upright part 9, of that partition, whereby the open end of the pipe *g*, will be closed, and the discharge of gas through the same will be stopped. The same object is effected by the valve *i*, fitted to the upper end of the pipe *g*; the stem of the valve being jointed to a weighted pendulum *i**, which closes the valve, on the meter being tilted forward, and thus stops the discharge of gas. The pipe *g*, may be used without the valve *i*; or if the valve *i*, be employed, the lower end of the pipe may occupy a higher position in the upright side 9, of the partition, so that it will not be closed by the water on the meter being tilted.

There is a small air-passage at *k*, in the nozzle at the upper end of the upright pipe 14, to permit air to escape from the interior of the meter when water is poured into it through the pipe: this air-passage is bored vertically through the nozzle (at the side of the opening through which the water is introduced) into the space above the partition 8, 9, 10, to allow air to escape therefrom as fast as water is poured into the space beneath the part 8, of the partition. A washer of leather or India-rubber is applied beneath the shoulder of the stopper, which is screwed on the pipe 14, so that the air-passage will be securely closed at the same time as the orifice of the pipe 14.

In concluding their specification, the patentees state that their invention consists in the means, hereinbefore described and represented by those parts of the drawings which are marked with letters of the alphabet for reference to those parts, by which the gas-meter becomes stopped, so as not to allow any gas to pass through it, in case of any attempt to make an improper use of the meter by tilting the whole meter backwards, by lifting up its front end 2, 2, so as to raise the surface of the water within, at the back end of the meter, above its proper intended level; for, in such case, the passage from the entrance-pipe *a*, into the horizontal part of the elbow-pipe *b*, will become stopped up by the water, whereof the surface is so raised above its proper intended level, as already explained; and which result is obtained in consequence of the new position given to the said elbow-pipe *b*, at the back of the meter, instead of at the front thereof; but the escape-hole *f*, for overflow of water, being nevertheless in front of the meter in consequence of the continuation *a**, of the pipe *a*, beneath the lower part of the box or case 1, 1. Also, in case of the whole meter being tilted forwards by lifting up its back end 1, 1, as in fig. 3, then, by means of either the water rising above the orifice at the lower part of the elbow-pipe *g*, in the upright partition 9, which is in front of the meter (although the pipe *b*, which is the overflow, is at the back of the meter), or else by the pendulum *i**, closing the protection-valve *i*, the passage for the gas to make its way from the interior of the meter to the exit conveyance-pipe *j*, will become wholly stopped.—[*Inrolled in the Rolls Chapel Office, June*, 1847.]

To William Farthing, *of the town and borough of Kingston-upon-Hull, and in the county of the same town, merchant, for certain improvements in the manufacture of glass,—being a communication.*—[Sealed 8th October, 1846.]

This invention of improvements in the manufacture of glass consists, firstly, in the application or use of artificial or mechanical means for the purpose of blowing, distending, or inflating glass, in order to produce glass shades, cylinders, or other forms or shapes (into which glass is required to be blown, distended, or inflated) of larger size and substance than can be obtained when the lungs of the workman are used, as well as to avoid the prostration of strength to the glass-blower, by the exertion required to blow heavy pieces. Secondly, the invention consists in so flattening cylinder or sheet-glass upon the floor of the kiln as to avoid the injury done to cylinder-glass, in the flattening process, by the dust and small particles of hard substances which arise from the fuel used in heating the kiln, and settle upon the floor of the kiln, or the "lager," or the glass. A modification of this part of the invention consists in a peculiar method of flattening cylinder or sheet-glass in a state of suspension, instead of flattening it upon the floor of the kiln, as hitherto. Thirdly, the invention consists in manufacturing spiral or twisted glass tubes, as worms for stills or other similar apparatus.

The first part of the invention, namely the application or use of mechanical or artificial means for the purpose of blowing, distending, or inflating glass, is accomplished by means of bellows or blowing apparatus, firmly fixed near to the workman. This blowing apparatus is furnished with a flexible tube or pipe of vulcanised India-rubber or other suitable material, which is provided with universal joints, to allow of its moving with facility in every direction, at the pleasure of the workman. The tube or pipe is attached at one end to the mouth of the bellows or blowing apparatus, and is provided at the other end with the means of being readily fixed to the pipe on which the glass is gathered, ready for being blown or inflated. The bellows or blowing apparatus should be attended by a person whose sole business it is to force air into and through the pipe on which the glass has been gathered, in order to effect the necessary expansion or inflation of the glass. Another mode of accomplishing the blowing, distending, or inflating of glass is by means of compressed air; the air being forced by an air-pump or condenser into a cast or wrought-iron receiver, having one, two, or more chambers, communicating with each other by valves, weighted and regulated at pleasure. From such chamber or chambers the air is allowed to escape by means of a flexible tube or pipe, fitted with universal joints, as already described, and also with taps or stop-cocks, whereby the passage of the compressed air through the pipe into the mass of glass may be regulated, as well as the escape therefrom effected when required.

The second part of the invention, namely, the improvements in the method of flattening cylinder or sheet glass, is accomplished as follows:—Firstly, a new arrangement of kiln is employed, whereby the necessity of placing any fuel whatever within, or directly communicating with the inside thereof, is avoided. In order to heat the chamber or chambers of the kiln, fire-places are made beneath the floors of the chambers, and the flues are arranged under the floors, around the walls, and over the arch of the kiln, in any convenient way, so as to produce a sufficient heat within such chamber or chambers to flatten the glass. In this kiln any ordinary fuel may be used which will give the heat required, and the advantage, as before stated, of preventing the creation and settlement of dust and small particles of hard substances on the floor of the kiln, the "lager," or the glass, is thereby effected, and the numerous defects now commonly observable in sheet-glass are prevented. Secondly, for the purpose of flattening glass cylinders, so as to avoid the injuries which they are now liable to receive (such, for instance, as defacing the surface or skin of the glass by burns, scratches, cockles, or otherwise), and thus to preserve the natural brilliancy and polish observable on the cylinder before it is subjected to the operation of flattening, the patentee employs an oven or kiln constructed somewhat after the manner of that shown in Plate II. This kiln is divided longitudinally into three chambers, which are intended successively to receive the glass under operation. The first and third of the chambers are provided with fire-places and flues for generating heat, and causing it to traverse under the floor and over the crown or roof of the chambers, whereby any required degree of heat may be kept up in the interior thereof. Fig. 1, is a longitudinal vertical section of the kiln; fig. 2, is a sectional plan view, taken in the line 1, 2, of fig. 1; and fig. 3, is a cross section, taken in the line 3, 4, of fig. 1, and looking towards the left-hand side. *a, b, c,* are the three chambers, separated from each other by the walls *d,* and *e,* each of which has a vertical opening or passage made through it, for the purpose of allowing a free communication to all three of the chambers from one to the other. The crown or roof of the kiln is also similary divided along its whole length, and on either side of this longitudinal opening are strong iron beams, which have their bearings in the end walls, and serve to support the roof. On the upper edge of these beams a rail or rib is cast, or otherwise secured, so as to form a railway for a carriage *f,* which is made to traverse the roof of the kiln, from one end to the other, by means of chains or otherwise. From a drum or pulley on this carriage *f,* is depended a chain, to the lower end of which a pair of clips or nippers *g,* are attached. These clips must be the length of the glass cylinder to be operated upon, and are intended to hold the glass in suspension, while the flattening process is proceeding, and deposit it eventually in the annealing chamber. By reference to fig. 2, it will be seen that the chambers *a,* and *c,* are each provided with two fire-places and appropriate flues, but it is obvious that one fire-place, with a different arrangement of flues, may be used, if thought more desirable. The first chamber *a,* is for the reception of the glass cylinder, which has been previously split in the usual way; and when the cylinder is partially opened by the action of the heat upon it, one edge of it is taken hold of by the clips or nippers *g,* suitably constructed for that purpose, and the cylinder is then suspended from the carriage upon the rails before mentioned. The object of thus suspending the glass is to preserve it from the injuries it would sustain by coming into close contact with, or being laid upon, the floor of the kiln, or upon glass, clay, stone, or other material or substance. The glass, thus suspended from the carriage, after being under the action of the heat sufficiently long to open out by its own weight, is drawn by a windlass and chain into the chamber *b,* which is termed the flattening chamber. At fig. 3, the peculiar construction of this chamber will be best seen. *h, h,* are two cast-iron frames, which form the sides of the chamber *b,* and, being set in the brick-work, assist in supporting the roof. These frames serve also as guides for the screws *i*, *i*, the inner ends of which turn freely in sockets, provided for them in the back of two cast-iron plates *k*; and the other ends are provided with hand-wheels for turning the screws, and causing them to propel the plates *k*, as required. The inner faces of these plates are covered with smooth planks of beech, sycamore, pear-tree, or other wood, neatly jointed together, or they may be coated with a fine plaster or cement, capable of withstanding the surrounding heat, and presenting a smooth and even surface. The object of thus providing the chamber *b*, is, that the glass, when suspended in the middle of the chamber by the clips or nippers pendant from the carriage, may be subjected to an even pressure between two even surfaces. But in order to protect these surfaces as much as possible from the heat which will issue through the openings in the cross walls, two vertical sliding shutters *l*, *l*, are provided, which, when let down, will form a narrow space round the glass, and prevent the heat from spreading laterally. When the glass is brought into the centre of the chamber *b*, that is, in the narrow space formed by the shutters, the plates *k*, are moved inwards by means of the screws *i*, until they come near to the shutters *l*, *l*. The shutters are then raised through openings made in the roof for that purpose (assisted in their ascent by counter-weights), and by the continued rotation of the screws *i*, the plates *k*, are made to close upon the glass, still in a heated state, and press it into a flat sheet. When this is effected, the plates are in like manner caused to recede, and the shutters *l*, are let down into their former position. The glass, still suspended from the carriage, is now moved forward by means of the windlass and chain, into the third chamber, where it is released from the clips or nippers, and properly placed for the purpose of being annealed.

The third part of the invention, consisting, as above stated, in the manufacturing of glass into still-worms or other similar apparatus, is accomplished in the following way:—A tube of glass is drawn out, in the usual manner in which glass tubes are made, to a sufficient length, and it is coiled, as the drawing proceeds, round a circular frame of wood or other suitable material, in the form in which metal still-worms are usually made, or in any other form in which they may be required; the frame being so constructed as to take in pieces easily from the inside, after the tube of glass has sufficiently cooled. The still-worm, thus produced, is then placed in an annealing arch or kiln and annealed.

The patentee claims, Firstly,—the employment, application, and adaptation of artificial or mechanical means to the blowing, distending, or inflating of glass, as hereinbefore described. Secondly,—the use of a kiln, constructed with fire-grates and flues, unconnected with the inside of the chamber or chambers thereof, as above described, whereby the heating of such kiln is effected without the admission of any fuel whatever within the chamber or chambers;—under this head of the invention, he also claims the flattening of cylinder or sheet glass by suspension, whereby the injuries arising from flattening the glass on the floor of the kiln, as hitherto practised, are prevented. Thirdly,—the manufacturing of glass tubes into still-worms or other spiral or twisted tubing, in the manner above described.—[*Inrolled in the Petty Bag Office, April,* 1847.]

Specification drawn by Messrs. Newton and Son.

To James Denton, *of Greenacres' Moor, Oldham, in the county of Lancaster, mechanic, for improvements in certain parts of machines used in the preparation for the spinning of cotton, wool, and other fibrous substances.*— [Sealed 21st November, 1846.]

This invention consists in certain modes of applying springs to the presser-flyers of machines used in the preparation of cotton, wool, and other fibrous materials for spinning, for the purpose of pressing against the slubbing or roving as it is wound upon the bobbin.

In Plate II., fig. 1, is an elevation and fig. 2, a plan view of the spindle, with its appendages, shewing one mode of applying a spring to the presser. *a*, is the spindle; *b*, the slubbing or roving wound upon the bobbin; *c*, the flyer; and *d*, the presser. *e*, is a spring, affixed to the spindle, and acting on the tappet *f*, at the upper end of the rod *g*, which rod turns in bearings *h*, *h*, and to its lower end the presser *d*, is fixed. By varying the size, form, and position of the tappet *f*, the presser can be forced against the slubbing or roving with such a degree of uniform or varying pressure as may be required.

The second method of carrying out this invention is exhibited at fig. 3. The novelty consists in fixing one end of the spring *e*, in the boss of the presser, and inserting the other end into a slot in the piece *i*, soldered to the arm of the flyer.

The last method is shewn at fig. 4, and consists in bending the top of the rod *g*, above the upper bearing *h*, so as to form a substitute for the tappet *f*, (figs. 1, and 2,) against which the spring *e*, acts.

The patentee claims, as his invention, the new combinations of the flyers, the pressers, and the springs, above described.—[*Inrolled in the Inrolment Office, May*, 1847.]

To William Johnson, *of Grosvenor Wharf, Millbank, in the city of Westminster, Gent., for his invention of certain improvements in machinery for raising or lifting and lowering weights or ponderous bodies.*—[Sealed 1st December, 1846.]

This invention consists in a peculiar adaptation of steam power to a drum barrel or cylinder, round which a rope or chain, for raising the weight, is passed. Rotary motion is given to the draught-barrel or pulley by a steam-engine; the outer end of its piston-rod being attached to a chain or rope, coiled round a winding-drum, of small diameter, fixed upon the axle of the draught-barrel.

In Plate I., fig. 1, represents the apparatus in elevation, a portion of the frame being removed to shew the internal parts of the machinery more perfectly; and fig. 2, is a horizontal view of the same. A, A, is a rectangular frame of iron, which contains and supports the machinery. It may be fixed firmly into the ground, or mounted upon wheels to admit of its being transported to different parts of a wharf or warehouse. In or near the centre of this frame A, the working cylinder of a steam-engine B, is fixed,—its piston-rod C, C, passing through both ends of the cylinder, for the purpose of rendering the machinery capable of raising and lowering heavy bodies, through the agency of cranes, fixed one at each end, when the machinery is required to be made double-acting, as it is supposed to be in the drawing, although but one crane is shewn; but in a single-acting machine it is obvious that the duplicate parts of the apparatus may be dispensed with. D, D, are the upright parts or standards of a crane, with the usual jib E, and pulleys F. G, is a horizontal axle, turning in plummer-blocks, fixed upon the bottom of the frame. This axle carries a conical pulley H, which has several grooves formed in it, of different diameters, for the purpose of receiving severally the draught-chain or rope of the crane; the different diameters of the conical pulley being designed to effect different powers of draught. This pulley is enabled to slide laterally along the axle G, for the purpose of bringing either of the grooves into a line of coincidence with the leading pulley of the crane; and the pulley is confined to the axle, when it revolves, by a key passed through a notch in the pulley; or it may be by the axle in that part being formed square. Upon the axle G, there is also a smaller pulley I, which is securely fixed to the axle, and always turns with it. This pulley is intended to receive the coiled chain attached to the end of the piston-rod C, so that as the piston recedes in the cylinder the chain may draw the pulley I, round, and with it the axle G, and the cone-pulley H. It will be seen in the drawing there is a cone-pulley H, connected to a draught-chain, at each end of the working steam-cylinder B; and that upon the axle to which this cone is keyed, there is affixed a small pulley I, with a chain connected to the end of the piston-rod, as before described,—thus making the machinery double-acting; that is, when a heavy weight is raising at one crane, a heavy weight may be lowering at the other crane; but, as before stated, it is not the patentee's intention in all cases to employ such reciprocating action; as a machine acting upon one crane only may, in most instances, be sufficient.

In working this machinery steam, at a high pressure, is to be provided in a boiler contiguous, from which the steam is to be conducted to the working-cylinder B, by a pipe K, shewn as broken off in the drawing. The steam when passed through this pipe will occupy the steam-box L, and by the sliding of the valve within the box the steam will, in the usual way, be admitted into the cylinder at its ends, for the purpose of working the piston: the action of the slide-valve is produced by the hand of a workman applied to the lever M, so that the operations of the machine shall be always under command. Supposing that the piston in the cylinder B, is, by the pressure of the steam, passing from the right-hand end of the cylinder to the left, the chain connected to the piston-rod and to the pulley I, will draw round the pulley I, its axle G, and the cone-pulley H; and the draught-chain of the crane being attached to the periphery of the pulley H, as the pulley revolves the chain will draw up the weight suspended from the jib-head. Now, to prevent the raised weight, suspended from the crane, from descending, the pulley H, must be made fast;—this is effected by means of a break, formed by a band N, and lever O. The band being passed round the pulley H, as shewn in fig. 2, the workman, by moving the lever O, will cause the band N, to be drawn tight round the pulley and prevent its rotation; the lever being held in its position by a click or pawle, resting in the teeth of a ratchet P, as shewn in fig. 1; and in lowering the weight the break may be gently released until the weight has reached its proper situation. The steam may be allowed to escape from the cylinder by a pipe Q, into the air; and it will be seen that a similar arrangement of parts being adopted to the reverse end of the machine, heavy weights may be either raised or lowered by their reciprocating actions.—[*Inrolled in the Petty Bag Office, June, 1847.*]

Specification drawn by Messrs. Newton and Son

To JOSEPH RENSHAW, *of Salford, in the county of Lancaster, mechanic, for certain improvements in machinery or apparatus for finishing velvets and other piled goods or fabrics.* —[Sealed 22nd June, 1846.]

THIS invention is intended to be applied to the finishing of all kinds of piled or napped fabrics requiring a lustre or gloss upon the surface (but more particularly to velvets manufactured from cotton), and consists chiefly in a certain novel arrangement of mechanism, designed to perform the several operations of waxing, "pegging," brushing, and "bossing," in one machine, in a much more even, perfect, and expeditious manner than the usual process of finishing by hand.

In Plate III., fig. 1, is a plan view of the machine, as seen from above; and fig. 2, is a longitudinal section of the same. A, A, is the main frame-work of the machine; B, B, the main driving-shaft; and C, C, the driving-pulleys. D, is a roller, upon which the velvet or other piled fabric to be finished is lapped; E, is a brush for cleaning any loose threads or other matter from the back of the cloth; F, is an adjusting roller to distend the cloth, and prevent it from "dragging" during the operation of finishing; G, is the waxing-slab; H, is the waxing-frame; and I, I, are the two waxing-rollers. The pegging-slab is shewn at J, J, and the pegging-bar at K;—L, is a rotary brush for laying the pile evenly in a longitudinal direction; and M, is the bossing apparatus, composed of a flexible band, provided with ribs of wood, having a surface of emery or other suitable material, and passing transversely over the cloth. N, is a measuring cylinder for ascertaining the amount of work performed; O, is a roller, covered with wire-cards, and intended to draw the cloth through the machine; P, is a weighted roller for giving an additional lustre to the surface of the cloth; Q, is a "whisk" for brushing any flue or dust from the surface of the fabric; and R, is the roller upon which the cloth is wound after the finishing operation is complete.

The operation of the machine is as follows:—Rotary motion being given to the driving-shaft B, it will be communicated by means of the strap *a*, to the shaft *b*, and by gearing *c*, *c*, to the roller O, which is covered with wire cards, for the purpose of taking hold of the back of the fabric and drawing it through the machine, whilst the operation of finishing is being performed. The cloth, thus proceeding through the machine, passes from the front roller D, over the tension-rails *d*, to the brush E, which clears the back of the fabric from any loose threads or dust. The cloth then passes under another tension-rail to the adjusting-roller F, at one end of which is fixed a pulley *e*, over which a friction-cord or band *f*, carrying a weight f^*, passes. The wire cards upon the roller F, entering the back of the cloth, will (by means of the friction created by the band or cord *f*,) act as a drag upon the cloth, thus distending it and preventing it from creasing. The cloth then passes between the waxing-slab G, and waxing-frame H, which latter has a rubbing motion imparted to it in the following manner:—The main driving-shaft B, is provided with a crank *g*, which (by means of the forked connecting rod *i*, *i*,) imparts a vibrating motion to the levers *h*, *h*, to which the frame H, is connected by the links *k*, *k*. Thus a longitudinal motion is given to the waxing-frame H, and a transverse motion is at the same time imparted to the block *l*, (which carries the wax, and which slides loosely in the frame H,) by means of the cords *m*, *m*, being both fixed to the main-framing A, of the machine. The cloth then passes between the two rollers I, I, (which are covered with wax) and thence over the pegging-slab J. The patentee here remarks, that, in order to equalize and improve the color of the pile, he mixes vegetable or mineral colors with the wax, according to the shade of color to be finished; and, in some instances, brushes may be affixed to the sides of the waxing-frame. As the cloth proceeds over the pegging-slab J, motion is imparted to the pegging-bar K, (which carries the peg *n*, made of wood, stone, or other suitable substance,) by means of the levers *o*, *o*, attached to the vibrating levers *h*, *h*: thus, by the weight and friction of the peg, a lustre or polish is imparted to the pile. There is a contrivance for raising and lowering the peg for the purpose of preventing the back stroke from being visible, which is best seen in the section, fig. 2. When it is desired to lift the peg from off the surface of the cloth, in order to let the wire pass (which connects two pieces of velvet together), it may be done by moving the handle *p*, whereby the sliding-piece *q*, (which is provided at its upper edge with projections) will move in the direction of the arrow, and raise the inclined frame *r*, upon which the ends of the peg-bar K, rest. The cloth, after pegging, comes under the operation of the rotary brush L, which lays the pile evenly and longitudinally, whence it passes between the bossing-strap M, and bossing-slab s, s. The bossing-strap M, is caused to pass tranversely over the cloth by means of the gearing *t*, *t*, and is for the purpose of giving the finishing transverse polish to the velvet, which then proceeds over the measuring cylinder N. Upon the spindle of this cylinder is a small worm *u*, in gear with a worm-wheel *v*, and at each revolution of the cylinder, the worm-wheel *v*, is moved round one tooth. The upper face of the wheel *v*, is graduated and numbered, and is provided with a stationary index *w*, which will shew the length of the cloth or fabric passed through the machine. The velvet then proceeds onwards over the roller O, between the rollers P, and *x*, past the whisk Q, to the roller R. The whisk Q, is caused to revolve by means of the strap *y*, and the roller R, is actuated by the strap *z*. 1, 1, 1, 1, are tension-rollers, for keeping the velvet or other piled fabric distended during the process of finishing.

The patentee claims the particular arrangement or construction of mechanism, as shewn in the drawing, to be employed for the purposes before described; and he also claims mixing vegetable or mineral color (as the case may be) with wax, employed in the process of finishing velvets and other piled goods or fabrics.—[*Inrolled in the Petty Bag Office, December,* 1846.]

Specification drawn by Messrs. Newton & Son.

To CHARLES YBRY, *of Rue Saint Lazare, Paris, in the kingdom of France, engineer, for improvements in ascertaining and regulating the speeds and times of railway trains.*—[Sealed 10th September, 1846.]

THIS invention consists in a mode of setting out time-tables for railway trains, and in apparatus to be used for that purpose, by means of which the time necessary for the successive trains to perform the different parts of their journey can be so regulated as to avoid each other; and the time of extraordinary or express trains can be quickly laid down, so as not to interfere with the progress of the other trains. Time-tables constructed according to this invention will shew, at a glance, the working of the different trains, giving immediately, without calculation, the time at which each train arrives at and departs from the various stations, the time at which it should be at any part of the journey, and the time that each train stops at any station.

The following is the principle on which the time-table is to be constructed;—In the movements of a railway train two things are to be taken into consideration, viz., the distance to be travelled, and the time to be occupied in travelling such distance. These two elements in constructing a time-table are to be represented by the vertical side and base of a right-angled triangle, and the motion of the train will then be represented by the hypotenuse of the triangle; but when a train is to stop at various stations between the two termini, then, as the time continues advancing, although the train does not, these portions of the whole time occupied in performing the journey will be indicated by horizontal lines of greater or less length, according to the time that the train is detained at each station.

To form a time-table the patentee draws, upon a sheet of paper, a parallelogram, the top and bottom lines of which are to represent time, and the perpendicular lines the length of the railway; the top and bottom lines are divided into hours and minutes, and the perpendicular into miles, and distances representing stations, &c. The movements and stoppages of each train are shewn by an irregular line, composed of oblique or diagonal parts (which indicate, by their greater or less inclination, the greater or less speed of the train), and of horizontal parts, which indicate the length of the stoppages. Lines are drawn across through all the divisions in the sides of the table, both at the stations and other places; and other lines are also drawn across, at right angles to these, through the divisions of hours and minutes on the top and bottom lines; and thus the intersections of the diagonal lines with the horizontal and vertical lines, just mentioned, will denote the different positions of trains at any moment, or the proper time when they should be at any part of the journey. The bridges, tunnels, and any irregularities of the line are indicated by a colored stripe across the table.

In Plate III., fig. 1, represents a time-table, constructed according to this invention. It is divided by the lines *a*, *a*, into a series of vertical strips, which are numbered to represent twenty-four hours; and these strips are to be subdivided, by other vertical lines, into half-hours, minutes, &c. The horizontal lines *b*, *b*, divide the vertical strips into spaces, each indicating five miles, and numbered accordingly: the number of lines *b*, *b*, drawn across the table, will vary with the length of the railway; and, if preferred, the spaces between them may each represent one mile, or any other distance. The thick lines A, to G, indicate the positions of the different stations and termini of the railway. The diagonal lines *c*, *d*, represent the course of two "down" trains; the dotted lines *e*, shew the course of a down goods or slow train; and the lines *f*, *g*, *h*, represent the movements of three corresponding "up" trains. The fast train, represented by the line *c*, starts, for example, from the terminus A, at 5 minutes past 7 in the morning, and reaches the station B, (13½ miles distant) at 28 minutes past 7; it remains here 9 minutes, and then proceeds on its journey, arriving at the station C, (43¾ miles from the terminus A,) by half-past 8; after stopping at this station for 5 minutes, it moves onwards, and reaches the station D, (76¼ miles from the terminus A,) by 29 minutes past 9; from the station D, the train starts at 11 minutes to 10, and arrives at the station E, (126 miles) by 13 minutes past 11; it remains here 9 minutes, and then passes on to the station F, (162 miles) which it reaches at 26 minutes past 12; at F, a stoppage of 10 minutes takes place, and the train finally arrives at the terminus G, (200 miles distant from the terminus A,) by 15 minutes to 2. The movements and stoppages of the other trains, indicated by the lines *d*, *e*, *f*, *g*, *h*, will be readily traced, without any further description.

The instrument used for drawing the diagonal lines across the time-table resembles a T-square; the stock or handle of which is applied to the edge of a board, whereon the time-table is fastened, in the manner represented at fig. 1. The blade *i*, turns on a pivot *j*, and carries a segmental rack, shewn at *k*, in fig. 2, which exhibits the stock *l*, with its top plate removed; the rack *k*, gears into a pinion *m*, fixed on the spindle of the hand *n*; so that any movement of the blade *i*, will be communicated to the spindle; and thus the hand *n*, will be caused to point out upon the index-plate *o*, the degree of inclination of the blade, and, consequently, the speed of the train, as before mentioned.

The patentee does not confine himself to the details, so long as the peculiar character of his invention be retained; but what he claims is, the mode of constructing time-tables for railways, and the apparatus used therefor, as above described.—[*Inrolled in the Inrolment Office, March*, 1847.]

To Richard Love, *of Coleman-street, in the city of London, merchant, for certain improvements in paving streets, roads, yards, and other surfaces, over which carriages and beasts of burden have to pass.*—[Sealed 1st December, 1846.]

This invention consists in forming the pavement of a combination of wood and stone, which materials are arranged in such a manner that the wood, by swelling, may be made to hold the stone firmly, and form a compact, strong, and durable paving, free from the objections that are incidental to paving, constructed of either of the above materials alone.

In Plate III., one mode of combining wood and stone is exhibited, but it is obvious that the combination may be effected in various ways. Fig. 1, represents a sectional view and fig. 2, a plan view of a piece of paving, constructed according to the improved plan. *a*, *a*, *a*, are blocks of stone of the ordinary shape and size, and such as are usually employed for paving; and *b*, *b*, *b*, are thin slips or narrow blocks of wood, from half an inch to two inches in width, placed between the rows of stone blocks. The slips or narrow blocks of wood may be employed in the natural or unprepared state, but the patentee prefers drying them by means of heat in stoves, or by currents of heated air, as is well known, or by compressing them under heavy pressure. The object of thus drying or compressing the slips or blocks of wood, previous to using them for paving, is to reduce their bulk, so that when they are placed beside the stone blocks in the paving, the wood, when made to swell by the moisture imbibed from the earth, the atmosphere, or otherwise, will pack closely and hold tightly against the stone, and form a compact and solid mass of paving. Another important advantage resulting from the employment of wood and stone in combination is, that there is a degree of elasticity imparted to the paving by placing rows of wood and stone alternately; and the noisy and destructive jar incidental to all paving composed entirely of stone is in a great measure obviated, and the paving is consequently rendered more durable. Various descriptions of wood are applicable for the above purpose, but the particular kind to be used will of course depend upon a variety of circumstances, such as the nature of the road, the amount of traffic expected, and the cost of the different kinds of wood in localities where the pavement is to be laid down.

The patentee states that he has found dried soft woods, such as fir, American willow, or poplar, to answer the intended purpose remarkably well, as these woods retain their moisture in dry weather, and therefore are not so liable to split or contract, and allow the paving stones to loosen, as some others of a harder kind.

If thought desirable, thin slips or blocks of wood may be placed between the stones composing each row, so that no stone may be found in contact with another stone; but when this arrangement is adopted, the wood blocks employed for this purpose must not be compressed, or too dry, or such as will expand to too great a degree after they are laid down, as otherwise this lateral expansion may produce the effect of dislocating the paving or forcing the curb stones out of their places.

The patentee claims the introduction of thin or narrow slips or blocks of wood between the blocks of stone employed for paving;—so that, when the said slips or blocks of wood are moistened by exposure to wet or a damp atmosphere, they may be made to expand, and, by packing closely against the stones, will firmly hold them, and render the whole a compact and solid mass of paving.—[*Inrolled in the Petty Bag Office, June,* 1847.]

Specification drawn by Messrs. Newton and Son.

To John Bayley, *of Heaton Norris, near Stockport, in the county of Lancaster, manager, for certain improvements in machinery or apparatus for spinning or twisting cotton and other fibrous substances.*—[Sealed 1st August, 1846.]

This invention relates to the "spindle and flyer" employed in the well known spinning machine called the "throstle." In Plate I., the improved spindle and flyer are shewn in elevation. *a, a**, is the spindle; *b, b**, the bobbin; and *c, c,* the flyer. The invention consists in forming the spindle of different diameters, as shewn in the drawing, so as to decrease it in size and weight as it approaches the top. It will be observed that the spindle is turned of a smaller diameter from the point marked *a**, to the top; and also that the bobbin is bored of a smaller diameter at the part marked *b**; thus the bobbin will slide upon two bushes of different diameters; and, consequently, there will be much less friction whilst running than in the ordinary mode; and as the spindle is lighter towards the top, it will run, at high velocities, much more steadily and true.

The patentee claims the peculiar formation of the spindle (as shewn in the drawing) in combination with the bobbin, as above set forth.—[*Inrolled in the Petty Bag Office, February,* 1847.]

Specification drawn by Messrs. Newton and Son.

To James Taylor, *of Furnival's-inn, in the county of Middlesex, Gent., for an improved apparatus for boring into the earth,—being a communication.*—[Sealed 28th January, 1847.]

This invention consists, firstly, in so constructing the boring-tool, that the borings or particles of earth may escape from the top of it into a receiver,—and therefore it will not be requisite to raise the borer to the surface every time it becomes full of earth; secondly, in the application of a receiver, of any required capacity, above the boring-tool, for the borings to escape into, as it becomes full, or as the particles of earth accumulate around it. The patentee suspends the borer and its receiver in slotted gear, to prevent concussion, whereby he is enabled to use much lighter rods than usual; but he does not claim this as part of his invention.

In Plate III., fig. 1, is a perspective elevation of an improved borer; and fig. 2, is a vertical section of the same. The part below the line A, B, is of the ordinary construction; above the line there is an opening *a*, situated immediately beneath the shoulder *b*, of the screwed-head of the borer; from this opening, a channel extends upwards through the screwed-head *c*, for the particles of bored earth, that accumulate around the borer (which is not hollow), to escape through; the particles of earth being prevented from returning by the clack-valve *d*. *e*, figs. 3, is a metal tube, which forms a receiver for the loosened earth; it is preferred to be made in lengths of about twelve feet, and into the lower end of it the head *c*, of the borer is screwed. The tube should be a little smaller in diameter than the boring, and sufficiently long to contain the particles of earth resulting from one day's operations; but it should not be inconveniently long; although, if required, the tube may even extend to the surface, so that the bored earth will be constantly delivered above ground. The receiver, shewn at figs. 3, is made in two lengths or pieces *e*, *f*, connected by the screwed joint-piece *g*, which is hollowed out to permit the earth to ascend from the tube *e*, into the tube *f*. To the upper end of the tube *f*, a screwed connecting-joint or cap *h*, is applied, having a vent *i*, formed in it, to allow the air or water to escape as the receiver becomes filled with the particles of earth.

Figs. 4, represent an elevation and vertical section of the slot gear used for suspending the borer and receiver, in order to avoid concussion. *j*, is a slotted rod, having a socket *k*, at the lower end, which is to be screwed on to the connecting-joint or cap *h*;—a fork *l*, embraces the rod *j*, and carries at its lower end the cross-bolt *m*, which works in the slot of the rod *j*. At the top of the fork a screw is formed, to connect it with the lift-rods (shewn in elevation and vertical section at figs. 5,) which reach to the surface:—by this arrangement the patentee is enabled to use much smaller lift-rods (such as stout wires) as the violent concussions hitherto produced when chiselling at great depths will be avoided.

The first improvement (consisting in the use of the hole *a*, and clack-valve *d*,) is applicable to the various kinds of borers now in use, it being only requisite to apply to the ordinary borer the parts shewn above the line A, B, at figs. 1, and 2.

The patentee claims, Firstly,—the passage *a*, and valve *d*, in the screwed head of the borer for the escape of the borings into a receiver. Secondly,—the application of a receiver, being a hollow tube, taking the place of a part or the whole of the ordinary lift and boring-rod, distinct from the boring-tool, and above the top of the boring-tool, to hold the said borings; such receiver being of any length that may be desired.—[*Inrolled in the Inrolment Office, July*, 1847.]

To JOHN JAMES ALEXANDER MACCARTHY, *of Sidney-terrace, Brompton, in the county of Middlesex, Gent., for certain improvements in anchors and fids for masts of vessels.*—[Sealed 22nd October, 1846.]

THE first part of this invention consists in so constructing an anchor, that on being lowered from a ship or other vessel, it will cant or turn over with the point of its fluke downwards, whereby its entry into the ground will be facilitated.

In Plate III., fig. 1, is a side elevation, fig. 2, an end view, and fig. 3, a plan view of one of the improved anchors. *a*, is the shank; *b*, the arm or fluke; *c*, the palm; and *d*, a heart-shaped stock or ring-piece of iron, welded or otherwise fixed upon the shank *a*, in place of the ordinary stock. The end a^1, of the shank is made much heavier than the other end; and the patentee prefers to form the shank of such shape, as to bring the centre of gravity of the anchor as near as may be to a line drawn between the end a^1, of the shank and the point of the fluke. The flat part of the stock or ring-piece *d*, which is welded to the shank, is heavier than the other parts of it, so as, in conjunction with its peculiar shape, to cause the anchor to lie, cant, or turn with the point of its fluke upon, in, or towards the ground, and thus facilitate its entry into the same.

The second part of the invention consists in two improved fids for supporting the upper masts of vessels;—one being termed a pawl and ratchet fid, and the other a metallic strap fid.

Fig. 4, is a side view of the top of a lower mast and the bottom of an upper mast, furnished with the pawl and ratchet fid; and fig. 5, is a detached view of a portion of the lower mast, with its trussel or cross-tree in section. On the top of the lower mast *a*, is mounted the ordinary cap *b*, through the orifice of which the upper mast *c*, is to pass; and a little lower down, upon the lower mast, is fixed a trussel or cross-tree *d*, with an opening in it for the reception of the upper mast. A pawl *e*, is let into a recess in the lower mast, and its upper edge takes into the teeth of the rack *f*, on the upper mast, in order to support the same, when it has been raised into the desired position by means of a rope or chain passing around the pulley *g*. When the upper mast is to be lowered, the pawl is raised out of the teeth of the rack by pulling the rope *h*, which passes over a pulley in the lower mast, and is fastened to the back of the pawl.

Fig. 6, is a side view of the top of a lower mast and the bottom of an upper mast, provided with the metallic strap fid; and fig. 7, is a back view of the same. The metallic strap *i*, is attached to the cross-tree *d*, by two metal loops, so that the lower portion of the strap may be drawn towards the mast *a*, when required, by pulling the rope *j*, connected with the chain *k*, which passes over a pulley on the lower mast, and is attached to the strap. The lower end of the upper mast is notched or cut, so that there may be a projection or shoulder, against which the strap can be drawn by the chain and rope when the upper mast is elevated; and thus the strap will be securely retained in its place. When the upper mast is not elevated, the lower part of the strap is drawn against the lower mast; but when the upper mast is to be raised, the rope *j*, is to be released, so as to allow the strap to fall against the upper mast, and to pass beneath the end of the same, as soon as it is raised to the required height.

The patentee claims, as his invention, Firstly,—an anchor constructed so that it will, by force of its own gravity, be canted, turned, or have a tendency to be turned, or be kept lying with the point of its fluke downwards, as above described. Secondly,—the application of a pawl and ratchet fid, for supporting the upper masts of vessels. Thirdly,—the application of a strap fid for supporting the upper masts of vessels.—[*Inrolled in the Inrolment Office, April,* 1847.]

To George W. Eddy, *of Waterford, in the State of New York, of the United States of America, for an improvement in the manufacture of cast metal wheels for railway and various other carriages.*—[Sealed November 3rd, 1846.]

This invention is intended to remedy the defects which are now generally found to arise in casting wheels with a chilled rim, and to render them less likely to break or crack when in use. Fig. 1, Plate III., represents the inner side of a railway wheel, made according to this invention; and fig. 2, is a cross section of the same. *a, a*, is the rim of the wheel, and *b*, the hub; *c, d*, are two cast metal plates, acting as spokes, and forming the sides of the wheel. The union of these parts is effected, by casting the whole in one piece in a mould prepared with an iron ring, properly adapted to it, for the purpose of suddenly chilling the periphery of the wheel, when the molten metal comes in contact therewith. The inner plate or side *c*, *c*, of the wheel is made convex, and the other side *d*, is cast with circular undulations, the object of which is, that when the sides receive the strain produced by the rapid cooling, and consequent contraction of the rim, the side having the undulations shall give to this pressure, instead of acting in an opposite direction to the convex side, and throwing all the strain laterally on the hub, as is the case when both sides are cast convex. By this means, therefore, of casting wheels, no division in the hub, transversely of its axis, is required, as has been heretofore adopted, to counteract the strain of the two opposing sides, and consequently a stronger hub and firmer wheel is produced. In place of having a convex side and an undulating surface for the other side, the patentee proposes in some cases to cast the wheel with undulating surfaces on both its sides, as shewn in the cross section, fig. 3. Openings are left in one side of the wheel (see fig. 1,) to enable the founder to sustain the core (for forming the hollow in the wheel) in its proper position, and to allow of the sand being removed when the casting is effected.

The patentee states, that he does not confine himself to the form of the undulations shewn, nor does he limit the application of his invention to undivided hubs; but he claims the improved manner, before described, of constructing a wheel, by making it with an undulating plate, in combination with a concave or convex plate, or another undulating plate, whereby it may be cast with a solid hub. He also claims the improved undulating plate or plates, when combined with a rim and with a hub, which may be divided transversely into two parts, and have its separation between the two plates.—[*Inrolled in the Inrolment Office, May,* 1847.]

To JOSEPH SERAPHIN FAUÇON, *of Rouen, in the kingdom of France, banker, for improvements in the manufacture of soap.*—[Sealed 14th January, 1847.]

THIS invention consists in manufacturing soap, by combining tallow oil with caustic soda water (leys).

These ingredients may be combined in the following proportions:—100 lbs. soda ley at 1.16 and 50 lbs. tallow oil; or 100 lbs. soda ley at 1.20 and 60 lbs. tallow oil; or 100 lbs. soda ley at 1.24 and 72 lbs. tallow oil; or 100 lbs. soda ley at 1.27 and 80 lbs. tallow oil; or 100 lbs. soda ley at 1.30 and 87 lbs. tallow oil. The soap made with 100 lbs of soda ley at 1.30 and 87 lbs. of tallow oil is superior in quality to that produced from 100 lbs. soda ley at 1.16 and 50 lbs. of tallow oil, or any other of the above mixtures. The strength of the soda leys may be above 1.30, or under 1.16, and the quantity of tallow oil used may be increased or lessened, according to the quality of soap required to be produced. The ingredients are mixed by first introducing the soda ley, in a cold state, into a tub, barrel, or other suitable vessel, and then stirring in the tallow oil; when the ingredients are thoroughly incorporated, the mixture is allowed to rest from twelve to eighteen hours; after which it is again stirred, if any separation is discernible, and then left for one or more days.

The patentee claims the combination of tallow oil and soda water in the manufacture of soap.—[*Inrolled in the Inrolment Office, July,* 1847.]

To Clemence Augustus Kurtz, *of Manchester, in the county of Lancaster, manufacturing chemist, for a new manufacture of a certain coloring matter, to be used in the dyeing or in the printing of woollen, cotton, silk, and other fabrics.*—[Sealed 27th January, 1847.]

This invention consists in the manufacture of a "substantive coloring matter," suitable for dyeing or printing a bronze or brown color, by subjecting aloes or an extract of logwood to the action of nitric or nitrous acid.

The mode of preparing the coloring matter from aloes is as follows:—Into a boiler or vessel, capable of holding about one hundred gallons, the patentee puts ten gallons of water and one hundred and thirty-two pounds of aloes, and heats the same until the aloes are dissolved; he then adds eighty pounds of nitric or nitrous acid, in small portions at a time, to prevent the disengagement of such a quantity of nitrous gas as would throw part of the contents out of the boiler. When the whole of the acid has been introduced, and the disengagement of gas has ceased, ten pounds of liquid caustic soda, or potash of commerce, of about 30° are added, to neutralize any undecomposed acid remaining in the mixture, and to facilitate the use of the mixture in dyeing and printing. If the coloring matter is required to be in a dry state, the mixture may be incorporated with one hundred pounds of china clay, and dried in stoves, or by means of a current of air. In preparing the coloring matter from extract of logwood, the materials are used in the manner and proportions above described; the only difference being that the extract of logwood is substituted for the aloes.

The coloring matter is used in dyeing, by dissolving a sufficient quantity in water, according to the shade required, and adding as much hydrochloric acid or tartar of commerce as will neutralize the alkali contained in the mixture, and leave the dye bath slightly acidulated. The article to be dyed is introduced into the bath, which is kept boiling until the desired shade is obtained.

When the coloring matter is to be used in printing, a sufficient quantity is to be dissolved in water, according to the shade required to be produced; this solution is to be thickened with gum or other common thickening agent; and hydrochloric acid, or tartar of commerce, or any other suitable super salt is to be added thereto, for the purpose before mentioned. After the fabrics have been printed with the coloring matter, they should be subjected to the ordinary process of steaming, to fix the color.

The patentee states that he does not claim the manufacture from aloes or logwood, by the action of nitric or nitrous acid, of any other coloring matter than a substantive coloring matter, suitable for dyeing or printing a bronze or brown color; but what he claims is, the manufacture of a substantive coloring matter, for dyeing or printing a bronze or brown color, from aloes or extract of logwood, by means of nitric or nitrous acid, in the manner above described.—[*Inrolled in the Inrolment Office, July,* 1847.]

Scientific Notices.

ON THE PROBABLE CAUSES OF THE IRISH FAMINE.

BY JOHN NOTT, ESQ.*

Though the people of England—nay, of Europe—are still suffering from the *contre-coup* of the calamity which has devastated Ireland, yet the public mind seems slowly recovering from the shock it has received; and it is probable the moral effect which has been produced will soon be obliterated, or be remembered only as a nine day's wonder. And yet, never was the fragility of human life—of sublunary things, so awfully demonstrated; never were the appliances of science or the provident powers of civilization so completely set at nought. Were this calamity wholly unexampled in Ireland, it would perhaps be reasonable to regard it as a visitation of Providence, to which we should submit in reverential silence, and permit it to subside without an effort to probe its causes or prevent its recurrence. But, alas! the present is merely an aggravated phasis of a periodical calamity, and has no other novelty than the wide-spread desolation which it has caused. It then indubitably results from the operation of natural causes, superinduced by locality, by climate, and by geographical position. We are therefore neither restrained by fatalism from seeking to penetrate these causes, or justified by prudence in rejecting a single suggestion, however erroneous it may appear, that will tend to fasten men's minds to this subject until a solution, whether positive or probable, of the difficulty be arrived at, that may enable us to stay the recurrence of this calamity: otherwise we must remain haunted with the disheartening conviction that the prosperity—nay, the existence of nations, is almost as precarious as that of individuals.

Almost from the first announcement of the failure of the potato-crop in Ireland, I entertained, with respect to the cause of that failure, certain notions which, however possibly or probably correct they may have appeared, in a theoretical point of view, I hesitated to obtrude upon public attention, as I had not a single corroborating fact to adduce that would warrant my so doing. But a short time since a letter appeared in the *Times*, from a member of the Board of Works in Ireland, which, I think, furnished the fact that was wanted to give an air of probability to my views, and thus insure them a degree of attention which a mere speculative reasoning could not command. In the letter alluded to, it was stated that, in the neighbourhood of several localities, great quantities of lightning had been observed, antecedently to the discovery of the failure of the potato-crop. When we reflect upon the peculiar structure of the potato-plant, at certain stages of its development, and upon the decomposing power of electricity, it does not appear at all improbable that, in the above words, the true cause of the disaster may be indirectly pointed out: at all events it cannot be deemed either futile or unprofitable to discuss the probability of such being the case, for, I repeat, with a view to a remedy, no probable or possible cause, that may be suggested, of a calamity so melancholy in its results, ought to remain without discussion and the most rigid examination by the thinking portion of the community.

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* Communicated by the Author.

To arrive at a satisfactory conclusion upon this, as indeed upon any other subject, the principal point is to state the question under consideration, with its accompanying circumstances, and then ascertain the principle by which it must be solved; or, in default of this, we may solve the question hypothetically, and the conclusion will be true, provided we can afterwards establish the truth of our hypothesis. With respect to the destruction of the potato-plant, we are not sufficiently acquainted with the nature, either of animal or vegetable life, to be able to trace the effects to their cause; it will be therefore necessary to reverse the procedure and assume a cause, and shew how it may have produced the effect. If then it can be subsequently established by direct experiment, that a similar effect may be produced by the assumed cause, which, it is now proved was, in certain localities at least, an antecedent circumstance of the effect already produced upon the potato-plant, we shall have presumptive evidence upon which a moral conviction may be based.

It will now be necessary to describe the comparative aspect that Ireland presents, to glance at the meteorological changes to which she is exposed, and examine what man has done to protect her from their effects. When a stranger enters for the first time any of the great inlets of Ireland, he is presented with a scene of surpassing loveliness—a noble bay or magnificent estuary—heights crowned with princely mansions, embowered in trees, presenting an appearance of wealth and aristocratic grandeur, perhaps not equalled by any other country in the world. But when he penetrates into the interior, he generally beholds a country, with an undulating surface, as naked as if it had never been the residence of man—whole tracts without a single tree or shrub, or flower—a bare bosom exposed to the action of a fickle climate—a torrefying sun or drenching rain. Hence, in Ireland, the hopes of the husbandman are exposed to a greater chapter of accidents than in any other country in the world. How different is the aspect of England! When the stranger approaches her shores, no such grandiose appearance is presented—all is very homely; but when he travels through her agricultural districts, he finds, with a more equable climate, that scarcely a property, a farm, nay, a field, but is circumscribed by hedge rows of trees, which generally protect her harvests from any injurious effects that might result from sudden atmospheric changes.

Again, Ireland forms the most western point of Europe, and, from her geographical position, is exposed to the whole power of the meteorological phenomena produced by the Atlantic ocean.— Let the wind blow in one direction, and the rain falls in torrents in one spot, while the sun shines in another, or she is universally drenched with rain; her sluggish rivers then swell beyond their limits, and whatever is caught upon their banks is swept away to the ocean. The wind changes—her streams are dried up, and her unprotected soil is parched. If the season be wet, the farmer is a ruined man, and nurses his despair until the rent day;—if it be too dry, he is equally ruined. And yet there are few facts better authenticated than that the climate of a country is greatly modified, by the accidents, whether natural or artificial, of its surface. Summer and Winter co-exist in the Alps, and in France different kinds of wine issue from opposite sides of the same hill.

As Autumn approaches, the rivers, lakes, and estuaries of Ireland are frequently phosphorescent, and, in certain localities, the limestone walls give indications of the land itself being phosphorescent. This is a phenomenon the possible consequences of which upon the potato gardens of Ireland and of Scotland deserve the most serious attention. From the remotest antiquity it has remained without any satisfactory explanation. It has indeed been attributed to animalculæ and to animal and vegetable matter at a certain stage of decomposition;* but it is certain that a more puerile and absurd doctrine could scarcely be propounded for so extensive a phenomenon,—and such I think will clearly appear from a consideration of its attendant circumstances.

This phenomenon is generally preceded, towards evening, by a somewhat humid state of the atmosphere; clouds are seen descending towards the hills, and in the distance the atmosphere has sometimes a vertically striated appearance, as though it were raining. When night closes in, the sky is completely covered, and has a blackish appearance. None of the fixed stars are perceptible, and the light of the planets is diffuse and lurid. Near the earth, the atmosphere has a remarkable degree of transparency; the contours of all bodies being recognizable with unwonted precision; and if the eye be approached to a limestone wall, with a somewhat southern aspect, the degree of luminosity perceptible will often strike the beholder with astonishment. Meteors of dazzling brilliancy may now be seen. Looking along the surface of the water, a whiteish vapour is perceived immediately over it, and not more than a *few* inches in altitude. In this state of things if an oar—particularly if it have any metallic body connected with its blade—be immersed in the water, it will sometimes (as I myself have seen it) draw up a sheet of either purple or perfectly white flame, the length of the blade of the oar, and several inches at its mean breadth. I could amplify these details, were it necessary for my present purpose to do so, but it is not, as I conceive I have stated sufficient to warrant me in drawing this conclusion, viz.,—that the phosphorescence, whether of the land or the ocean, of rivers or estuaries, is a purely electrical phenomenon.

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* This theory has been put forth by naturalists, and generally accepted by electricians without examination.

Before I proceed to point out the effects that may be produced upon vegetation by electricity, it will be necessary, by an appeal to electrical principles, to demonstrate its *modus operandi* in producing the above phenomenon. It is now well ascertained that electricity is an all-pervading principle, and is everywhere present, either apparently at rest or in motion, either latent or active; that its state of distribution cannot be disturbed in one body without being more or less disturbed in every adjacent body. But the atmosphere presents this most remarkable peculiarity, that its upper and lower strata are in opposite electrical states; and if the lower strata of the atmosphere be positive, the earth will be negative. Now the earth being in contact with its atmosphere, it is evident that these opposite electrical states could not co-exist without the existence of some coercive force to keep the opposite electricities separate. The nature of that coercive force consists in the non-conductibility of the atmosphere when dry; which may be thus analogically proved:—If a non-conductor be held in contact with an electrised body, the electricity of the latter will not be carried off, but the non-conductor itself becomes electric by induction or influence; and the distribution of the electricity of the non-conductor will then be found identical with that of the electricity of the atmosphere. For instance, if the electrised body be negative, the adjacent portion of the non-conductor will be neutral; the succeeding portion will be positive, and the extreme end negative. Accordingly, we find that a neutral or non-electric stratum of atmosphere exists immediately over the surface of the earth, and keeps the electricity of the earth separate from the opposite electricity of the atmosphere.

The thickness or altitude of this neutral stratum is generally found to be about four or five feet; but it varies according to the hygrometrical state of the atmosphere—the quantity of free electricity the latter contains, or by the presence of clouds. Sometimes this non-electric stratum is reduced to a mere plane; and then an interchange of electrical action takes place between the earth or the ocean and the atmosphere—that is, between a conducting and a non-conducting body (conditions which are essential to the production of every species of phosphorescence); and thus, by the union of the two electricities, the phenomenon of terrestrial or oceanic phosphorescence is produced. These deductions may be established by a variety of experiments. If a well insulated conductor be highly charged, it becomes luminous or phosphorescent; and I have repeatedly seen the underneath surface of a glass insulator, in contact with the table, brilliantly illuminated. Again, if a jar be charged beyond its capacity it will discharge its exuberant quantity in phosphorescent streams.

Now free electricity possesses either a deflagrating or a decomposing power, according to the velocity of its motion, and the nature and capacity of the body through which it passes; and, therefore, upon the potato-plant—the conductibility of the stem of which must be much greater than that of almost any other vegetable, from the great quantity of moisture it contains, and from the almost total absence of woody fibre—it would exercise a disastrous influence. To properly estimate this influence it will be necessary to describe the structure of the potato-plant, and then examine what effect would probably take place by the passage of electricity through it, during the existence of the phenomenon above described.

The potato-plant grows in parallel beds, separated by deep trenches, which, by the way, is a circumstance remarkably obnoxious to the effects of phosphorescence; for these beds, forming elevations on the crust of the earth, must act somewhat analogously to points, in giving off and attracting electricity; more particularly as their upper surfaces are thick set with points, formed by the stalks of the potato. These stalks are straight, stout, and tubular, and are filled, at certain periods, with sap; and their roots are formed of long fine fibres, which diverge in all directions, and are covered with a number of tubercles. Now, in a highly electrical state of the atmosphere, these tubercles may cause a large quantity of electricity to pass through the stem of the plant, its texture would thereby be injured, or its sap would be partially decomposed. In either case, it seems probable the plant would decline, and the tuber would be lost; and thus do I conceive it possible, that by an interchange of electrical action between the earth and its atmosphere, during the existence of that extensive phenomenon, known by the name of phosphorescence, may the destruction of the potato-crop in Ireland have been effected.

Nothing would be more easy than to put the truth of the hypothetical cause, which I have now advanced, of this dire calamity, to the test of experiment, by causing a stream of frictional electricity to pass, from beneath the root of the plant, up through its stem. This should be tried upon several healthy specimens, at different periods of their growth. Then, if similar or analogous effects be observed, by microscopical examination of the tubers, the probability of the true cause having been pointed out, will in one case be greatly increased,—in the other it will be demonstrated; as we are warranted in referring like effects to like causes.

It may be said:—Suppose the conclusions you have drawn from electrical principles be admitted, and that phosphorescence is an interchange of electrical action between the earth and its atmosphere; and also that it be proved by experiment, that the vegetation of certain plants would be injured by their forming the channels through which such action may take place, what follows? Can we prevent the operation of natural causes, or interfere with the economy of the universe? No, generally speaking, we cannot; but when we have inductively acquired a certain acquaintance with a physical cause, such as we have of electricity, we may in certain cases modify its action, and thus mitigate its effects. In the present instance, I have attributed an extensive calamity to the effects of a co-extensive phenomenon, which is of almost nightly occurrence in certain latitudes, and periodically visits others. A concomitant effect has also been assumed to accompany this phenomenon; and that is, the reduction in altitude of the non-electric or neutral stratum of the atmosphere, whereby, over an immense extent of surface, the electricity of the atmosphere is brought within the attracting or striking distance of that of the earth.

To prevent, in rural districts, the reduction in altitude of this neutral stratum is, then, the principal point; and it seems probable that this would be completely effected by the erection of one or more lightning-conductors in every potato-garden, according to its extent. These conductors would regulate the quantity of electricity present, at a certain elevation, in the atmosphere; and would effectually preserve the crops from the consequences that might result from its accumulation.

This plan, or one somewhat analogous to it, has already been tried on a small scale, with the ostensible object of increasing the fertility of the soil; and contradictory reports have appeared as to its efficacy; but such experiments are neither based upon theory, nor guided by principle, and may therefore be left in the hands of the empiric. We are well acquainted with the destroying and decomposing powers of electricity, which are known to be unbounded; but of its fertilizing properties we know nothing. It is no doubt unnecessary to add, that tall handsome boundary trees, judiciously planted, would subserve the purpose of the proposed lightning-conductors.

The following observations of Arago, who has paid much attention to meteorology, are strikingly confirmatory of the preceding views. "It would be easy," he says, "to prove that electricity is one of the causes which influence, in a remarkable manner, climatological phenomena. But let us go further, and enquire whether the electrical state of a whole region may not be modified by man. For instance, to clear a mountain of its trees, is nothing more nor less than to destroy a number of lightning-conductors, equal to the number of trees cut down; by which means the electrical state of a whole country must be modified, and one of the elements concerned in the formation of hail be accumulated in a locality where it was before inevitably dissipated by the silent and incessant action of the trees. Observations are by no means wanting to ratify these theoretical deductions."

"According to statistical accounts, the losses occasioned by hail in the continental states of the King of Sardinia, from 1820 to 1828, inclusively, amount to the enormous sum of 46 millions of francs. Three provinces, the Val d'Aoste, the valley of Suza, and the upper Maurienne, are not included in this account, as they had not been injured by hail. It is worthy of remark, that these three provinces have their mountains well covered with trees.

"Genoa, which is one of the warmest provinces, is scarcely ever visited by this meteor; a fact which may find an explanation in the dense population of its mountains."

"Atmospheric electricity gives rise to phenomena of immense extent; nevertheless, these phenomena seem to originate in purely local causes, and are propagated by influences which seem limited to particular zones, and sometimes narrow ones.

"On the morning of the 13*th* of *July*, 1788, a hail-storm, which commenced in the south of France, traversed in a few hours the whole length of the kingdom, and then passed over the low countries and Holland.

"The lands devastated by this hail-storm in France, were situate in two parallel tracts, running from south-west to north-east. One of these tracts was 175 leagues long; the other about 200. The mean breadth of the most western one was four leagues; that of the other, only two leagues. These tracts were separated by an interval of about five leagues, where rain only was experienced. This hail-storm travelled from south to north at the rate of sixteen leagues an hour.

"In the 1039 parishes which were visited by hail on this occasion, the damage, according to an official enquiry, amounted to 25 millions of francs."

"All this devastation was unquestionably caused by changes in the electrical and thermometrical state of the atmosphere.

"The two tracts of land, visited by the hail, commenced in Aunis and in Saintonge. It may be asked, why there, and not elsewhere? Why did not the storm commence at any other point of the parallel of latitude passing through its southern extremities? The answer, no doubt, would be, that in Aunis and in Saintonge, on the 13th of July, 1788, the temperature of the atmosphere and its electrical state were eminently favorable for the production of a hail-storm, with a direction from south south-west to north north-east. Not a question of it; but these electrical and thermometrical conditions, favorable to the production of hail, were they not intimately connected with the labours of the husbandman, with the existence of such or such a mass of trees, with the state of irrigation, with circumstances varying with the wants and caprices of man? With respect to temperature, the answer would not be doubtful to anybody. As to the other point, the connection will not be less evident, if we recollect that evaporation is an abundant source of electricity, and vegetation is considered, by many philosophers, as one of the principal causes of the free electricity of the atmosphere."

To the preceding observations may be added, that at one time the losses occasioned by hail in the south of France were so great that the country people, as soon as apparently dangerous clouds were seen accumulating, used to go to the hills and ignite large quantities of gunpowder, with a view to change the electrical state of the atmosphere, and thus prevent the formation of hail. Latterly, lightning-conductors have been erected in various localities for the same purpose; and since their erection, though for many years an assiduous reader of the *Courier Français*, I have not heard of any violent hail-storm having visited these localities.

The reasoning of the Frenchman, in the above instances, was quite natural. Hail was the proximate cause of the losses he used to sustain; therefore, to find out the elements concerned in its formation, and modify them as much as was in his power, was the obvious course; but the unfortunate Irish and Scotch peasants have no such data furnished them, that would point out the means of protection. They are placed in localities—islands—peculiarly obnoxious to a destroyer that comes only by night; and whether perceived or not perceived, is a profound mystery to them. Hence they sometimes wake in the morning, and find their previously healthy crops blighted; for that particular electrical condition of the atmosphere which produces the phenomenon of phosphorescence can only exist during the transition state between great heat and cold, accompanied with rapid evaporation. That atmospheric electricity is the cause, not only of the disease called curl, but also of blight, would seem to be sufficiently established by the fact that, in such cases, the leaves of the plant exhibit all the appearances of incipient carbonisation; and if they be detached and placed in an herbal, they turn quite black; but the following facts will, in my humble opinion, place the matter beyond doubt.

On the night of the 27th of May this metropolis was visited by large quantities of sheet-lightning, which I witnessed from my bed-room window. The following morning I perceived that the tips of the leaves of a variegated laurel, which was growing outside the drawing-room window, were carbonised. There could be no doubt as to the cause. The same day, on a visit to a friend at Notting-hill, I found that the tips of the elder leaves of the potato-plants were carbonised in identically the same manner. Now, as the upper or young leaves were uninjured, there can be no question that the electricity of the earth streamed through these plants. A few days after, the curl, as well as brown spots, made their appearance, not only on the leaves of the laurel, but on those of the potato-plants; and the stems of the latter, though apparently uninjured, when broken off near the ground presented internally a blackish appearance—an incipient state of carbonisation, so marked as not to be mistaken. If these facts bring not conviction to the mind, reasoning would be vain.

But even supposing that these facts do not bear out the conclusions which I have drawn, still the erection of lightning-conductors, as a precautionary measure, is a remedy at once so obviously rational and prudent—so completely within reach of the humblest cultivator of the soil, that the mind recoils from the thought of its adoption being delayed until more convincing and, no doubt, more calamitous proofs of its necessity, be brought home to men's bosoms.

May, 1847.

Notices of New Works.

Registration of Designs, in order to secure Copyrights, &c., by Wm. Carpmael; Copyright and Designs as distinguished from Patentable Invention, by Wm. Spence; the Laws relating to the Copyright of Ornamental Designs and Articles of Utility, considered in their practical bearings, by Newton and Son.

It is extremely desirable, on the promulgation of any new law, whatever may be its object, to ascertain its exact bearings and probable effect on existing statutes. Generally speaking, there is no lack of essays upon, and digests of, Acts which are likely to effect a large class of the public; but on the laws relating to the copyright of designs, the above mentioned pamphlets are, we believe, the only attempts at explaining their spirit and provisions, if we except some remarks which have been occasionally made in periodical journals. The growing importance of the more recent of these copyright Acts, as shewn by the rapidly increasing number of registrations effected under it, suggests the propriety of contrasting the opinions which have been given to the world respecting its powers and limits of protection. In each of the works noticed above, the Act for Ornamental Designs is treated of, as well as the Act for Protecting Designs for Articles of Utility; but the former being in itself so clear and definite in its application to the different branches of manufacture, its provisions have been seldom disputed. We shall, therefore, confine our notice at present to the more recent Act for protecting new forms independent of ornament. It will be remembered, that in the Act 6 & 7 Vic., cap. lxv., its purport and bearing is thus set out in the second clause:—

> "And with regard to any new or original design for any article of manufacture having reference to some purpose of utility, so far as such design shall be for the shape or configuration of such article, and that whether it be for the whole of such shape or configuration, or only for a part thereof, be it enacted, that the proprietor of such design not previously published within the United Kingdom of Great Britain and Ireland, or elsewhere, shall have the sole right to apply such design to any article, or make or sell any article according to such design, for the term of three years, to be computed from the time of such design being registered according to this Act."

From these words then we have to construe and define the limits of protection under every conceivable circumstance; and this, it will be readily granted, is no easy task. Let us now see what Mr. Carpmael says on this point:—

> "The intention of these Acts (the Ornamental and Non-Ornamental) has been very much misunderstood; it has been supposed by many, that new inventions of a mechanical nature, such as weighing-machines, lamps, pumps, and machines of various kinds, which depend on their modes of action, and not on their shape or configuration, may be secured for a short period; and, in fact, that the Statutes offer the same protection as a patent, and for the same class of cases. This is entirely erroneous; for it may be broadly stated, that an invention, for which a patent may be secured, can in no way be protected under either of the Registration Acts; and, on the other hand, the invention of a design which can be protected under the Registration Acts cannot be made the subject of a patent."

Here, then, we have a distinct assertion from a gentleman of much experience in patent matters, that the intention of the Registration Act is not to create "a little patent." It is something to ascertain what it is *not*; but we search in vain to discover what it is. He further states, that in registering any new design, —for a table-lamp, for instance, all that could be secured, would be, "some novelty in the shape or configuration." This is, indeed, an undeniable assertion; nor would it require any large amount of discernment at the first reading of the second clause (quoted above) to come to a similar decision. We have, however, something more to the purpose in the following, although the negative is still preserved:—

> "No new mode of supplying oil to the wick, nor any new mode of raising the wick, nor any new apparatus for supplying air to support combustion, could become the subject matter of a registration."

It is one point gained, when we have fairly ascertained, that mechanical arrangements, which are so frequently submitted for registration, are altogether without the pale of copyright protection; but the vital question, viz., What is a proper subject for registration? finds no response in Mr. Carpmael's book.

Let us now turn to the second on our list, "with a view" as Mr. Spence himself states, "of ascertaining what is the real effect of a registration—what is the amount of protection secured thereby." We here find the subject treated rather argumentatively than authoritatively, and by our author's steady and even progress in the discussion we are inclined to an entire approval of his deductions; but when on the verge of the argument, after having traversed its intricate windings, we find that the result, instead of being within our grasp, has "vanished into thin air." As an instance, we take the following passage:—

> "But it may be conceived that the legislature meant to give some scope to the registration (for shape or configuration) beyond this, from the circumstance of a description of the design being allowed, when necessary, to make the same intelligible, and in certain cases to distinguish between the old and new parts thereof. Undoubtedly, if not the slightest conceivable departure from the precise shape of the design were to be included, drawings would suffice without description, and therefore the provision in the Act for the

latter tends to raise the supposition that some scope was intended to be given—how much does not appear.

"Now what is in reason susceptible of inference on this point from what has been seen in reference to the spirit of the Act? Certainly nothing which goes the length of including that which is commonly understood by the word invention in reference to patents, even supposing we limit the word to the sense of mechanical invention. Indeed, it is much more easy to speak negatively than positively as to the meaning of the Act. And perhaps the most that can reasonably be urged is, that something more was contemplated as attaching to a registration of a design, having reference to some purpose of utility, than the bare outline of the parts shewn in the drawings filed by the registrar: the determination of that something being left, however, to the discretion of the magistrate or judge before whom the matter was to be brought in the event of alleged piracy. If it be true that there is no further direction than this given in the Act, either expressly or impliedly, respecting the scope of a registration, then it follows that there is much uncertainty in the protection of any article beyond its mere shape or configuration. Neither is there any positive doctrine on the subject to be gathered from precedents, so that every case has to be determined according to what shall appear to the person trying it to be the equitable considerations involved in it. Here, however, the difficulty still follows us, because here is equity to be administered without the guidance of recognised principles which have received the sanction of authority. And surely it cannot be said that a magistrate can dispense with those aids which a judge requires, and that the unassisted judgment of the former is competent to determine difficult points of law and equity."

At the conclusion of his observations, Mr. Spence has the following:—

"Hence, to say the least, it is extremely doubtful whether any of the numerous mechanical inventions which have been registered have that kind of legal protection which their authors intended to secure."

It will now be understood that the strictures we have made from time to time on the unintelligibility of the Non-ornamental Designs Act, have not been uncalled for, since we see that the amount of protection secured by a registration has failed to be ascertained by at least two gentlemen whose attention has been directed to the subject. We have, therefore, as a last resource, to refer to the third work noticed at the head of this article, but, for obvious reasons, we shall make no further remark on its contents, than that, if in the following extract the limits of the Act, for protecting designs for the shape or configuration of articles of utility are not clearly pointed out, the path is yet open to any aspirant for the settlement of this much debated matter.

"It being understood, that either the whole or the part of an article may be secured by registration, let us suppose that an improvement is effected in an Argand gas-burner, whereby a more intense light is obtained:—The air, which heretofore ascended through the central opening in the burner, and passed upward in a vertical current out at the chimney, is now, we will say, deflected on to the flame by placing a horizontal disc immediately above the central opening. This disc being a new appendage to, or portion of the burner, would, as far as its form is concerned, be a fit subject for registration; but if, instead of the disc, a deflector of another shape, such as an inverted cone, were substituted, this would be no infringement of the registration: because the claim of novelty must be limited to the *form* and not the *application* of the central deflector, which causes the air to impinge on the flame, and produce a more brilliant light. From this it will be evident, that to protect the invention of the central deflector, the Registration Act will not avail; it therefore falls within the statute of monopolies, and is a proper subject for a patent; for, if the *application of a central deflector* were claimed, as it might be under the more extended scope of the patent law, any variation in the form of the deflector (even if nothing but the disc were shewn in the specification) would be an infringement on the patent.

Let us now admit that the central deflector, as far as the disc is concerned, is open to public use; if, under this view of the case, an improvement is effected in the disc, by attaching to its under side other discs concentric therewith, but of a smaller diameter—thus forming steps to meet the upward current of air at different heights, and deflect it on to the flame; or if a disc of that shape is cast in one piece (which is the same thing), such deflector will be a fit subject for a registration; and should any party after the date of such registration manufacture the deflector, with either less or more of such steps, he will become liable to a prosecution for infringement.

NOTICE OF THE EARLY EMPLOYMENT OF KITES FOR MILITARY PURPOSES BY THE CHINESE; ALSO NOTES CONCERNING IRON AND COPPER VESSELS.

Extracted from Chinese Books, and read before the Académie des Sciences, Paris,

BY M. STANISLAS JULIEN.

ACCORDING to the Chinese Encyclopœdia *Khé-tchi-king-youen* (Book LX., fol. 8), tradition attributes the invention of kites to the celebrated Chinese General Han-sin, who flourished in the year 206 B.C. It was not until several centuries later that they were employed for the amusement of children. This general (says the work intituled *Tching-tchai-tsa-kai*) agreed with Tchin-i that he would enter at the centre of the city which he was besieging; but as he was ignorant of the distance between his camp and the Palace Wei-yang-kong, which he wished to enter by a subterraneous passage, he caused a large kite to be constructed, which, with a favorable wind, he sent in that direction (taking account no doubt of the length of the string, and the curve it described).

From the same work we learn, that in the third year of the period Thai-thsing, of the reign of the Emperor Wou-ti, of the dynasty of the Liangs (A. D. 549), Héou-king besieged the city of King-thai. As the inhabitants could not communicate their critical position to any distance, they constructed a great number of paper kites, and set them flying, in order to ask for succour. Héou-king seeing them rise in the air consulted his officers. "Wherever these kites alight," said one of them named Wang-wei, "they will give news of the besieged, and make known their wants," &c.

In the same work (Book XXVIII., fol. 12), the celebrated philosopher Hoaï-nan-tseu, who flourished between the years 156 and 163 B.C., speaks of ships constructed entirely of iron. In the history of the district of Kiao-tcheou we are told, that in the district of Ngan-ting there still exists the copper ship of Keou-tsien, King of Youé, who reigned in the year 465 B.C. It was buried in the sand, and was visible at the ebb of the tide.

We read in the Recueil *Chi-i-ki* (published by Wang-kia between the years 265 and 419) that when the king of Yen-khieou sent the tribute, his ambassador went in a vessel entirely constructed of sheets of copper.

We learn from documents, which have been published, or may be easily produced, that 2700 years before the Christian era, the Chinese were acquainted with the art of raising silk-worms; 1000 years B.C. the compass for guiding travellers by land and sea was known (see Klaproth's Memoir, addressed to M. Alex. de Humboldt); 400 years B.C. boats and vessels, constructed entirely of iron, were used. The knowledge of ink and writing paper is dated 200 years B.C.; and gunpowder, according to Father Amyot, a century before Christ. The invention of printing from wooden blocks is set down between 581 and 593 A.D; engraving on stone 904 A.D.; with moveable types, between 1041 and 1049 A.D.; porcelain in the 8th century; boring wells, the art of lighting and heating with inflammable gas (conducted at great distances under ground) suspension bridges, fire-engines, playing-cards, A.D. 1120; paper money, between 1260 and 1341, &c.

In medicine, they treat with success many disorders which have hitherto been deemed incurable in Europe. They are also acquainted with the art of dyeing the whole pilatory system, and thus imparting to red or fair hair a black hue, which will last until it is turned grey or falls off from age. M. Imbert, who is now a bishop in China (to whom we are indebted for a description of the Chinese method of boring wells), offers (according to M. l'Abbé Voisin, one of the present directors of foreign missionaries) a living proof of this internal coloring of the hair. This is the reason why the Chinese people have, from the earliest ages, been called the *black-haired nation.*

As regards agriculture, they obtain, by means of manures and other means, constant and regular results, which suffice to feed three hundred and sixty millions of men, provided they are not visited by inundations, storms, or other natural calamities.

In horticulture, they are acquainted with the art of changing the colors of flowers; also of forcing flowers and fruits, and producing from dwarf trees as fine fruit as that generally obtained from large trees;—in fact, they seem to be possessed of the power of producing in the vegetable kingdom phenomena which would be regarded in these countries with admiration and pleasure.

It would be necessary to write a long memoir, in order merely to point out what may be learnt from Chinese books, useful in the arts and manufactures, and also for the sustenance, comfort, and amusement of all classes of mankind. It is very probable, that in order to meet the requirements of the arts, and keep up with the progress of civilization, European genius will discover, during many future ages, after long-continued efforts and experiments, a multitude of useful inventions, which were previously known by the Chinese, but which are hidden in their books, and will remain hidden, as long as a liberal and enlightened Government refuses to undertake, either at its own expense, or under its auspices, to obtain or translate the works in which scientific and industrial processes, applicable to our social state and our wants, are accurately described.

For this purpose, the utility of which is incontestable, it would be sufficient to devote a moderate sum every year to the publication of one or two volumes, containing extracts and translations of this kind. At the end of ten years, and at a comparatively trifling expense, we should be in possession of nearly all the serviceable, industrial, and scientific Chinese works, by which means most important discoveries might be made.—[*Comptes Rendus.*]

CHINESE METALLURGY:—ON CERTAIN ALLOYS OF COPPER FOR GONGS AND TAM-TAMS.*

BY M. STANISLAS JULIEN.

It is only after copper has been converted into brass that it is melted and worked up into various articles. By combining it with a certain quantity of arsenic, *pé-tong* or white copper is obtained, which is much more difficult to work than brass, and is only made use of by the rich. Brass produced by a mixture of copper and calamine, may be worked by the hammer while hot; but if, instead of calamine, lead be employed, it must be worked while cold.

In order to render the copper fit for the construction of musical instruments, it must be alloyed with 20 per cent. of tin. These instruments are made in a single piece, and without soldering. With regard to copper utensils, of a square or round form, the parts are united by means of rivets, or by soldering. There are two kinds of solder employed for this purpose—one in which tin powder or filings are used, and another wherein powder or filings of bell-metal (composed of 80 parts of copper and 20 of tin) are employed. These copper filings are fixed upon the articles to be united, by mixing them with a paste of rice, which may be afterwards removed by washing. In this way the copper filings, which would otherwise soon be dispersed, will be deposited in the proper place. Pure copper is used for soldering silver vessels.

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* Extracted from the little Cyclopœdia *Tkien-kong-khaï-we*, published in 1637, by *Song-ing-sing*.

When any copper vessel is required to be wrought by the hammer, such for instance as a tching, commonly called a *lo* (a gong or tam-tam, with a flat bottom), it is not necessary first to cast the metal in a round form—it may be wrought by the hammer without any preparation. If, however, it be required to form a tcho, commonly called a copper-drum (a tam-tam), or ting-nings (cymbals), the metal is first cast in a roundform, and afterwards wrought into the desired form by the hammer.

No anvil is used for hammering out a gong or tam-tam. For this purpose, the mass or sheet of metal is laid upon the ground. If the instrument is to be of large dimensions, several workmen are employed, who, being placed round it, keep continually beating the metal, which soon spreads, and vibrations or sounds follow the blows struck. When the centre of the tam-tam has been raised in the form of a boss, an experienced workman gives it the required tone by hammering. Two kinds of sound may be given to it,—the female or sharp sound, and the male or dull sound; for this purpose, however, it is necessary to calculate within a hundredth, and even a thousandth part, the degree of elevation of the centre. The male sound is produced by a great number of blows. The metal, after being wrought, is of a dull white color; but, on being filed, resumes its natural color.—[*Ibid.*]

ACCOUNT OF THE MEANS EMPLOYED IN THE MANUFACTORY OF MM. PEUGEOT, JAPY, AND CO., AT HERIMONCOURT, TO PRESERVE THE WORKMEN FROM INJURY WHEN USING GRINDSTONES.

BY M. A. MORIN.

AMONGST the trades which tend to shorten the life of the operative, that of grinder in the manufacture of swords, bayonets, and and all kinds of hardware, is certainly one of the most injurious. The breaking of the stones, and flying off of the pieces with great violence by centrifugal force, although very dangerous, is not the most serious evil which the workman has to encounter, to say nothing of its having been greatly lessened by the recent improvements in mounting the stones; there is another danger which, although slow in its action, is continual and certain in its results, carrying off most workmen before they reach the age of forty or forty-five.

Incessantly bending over a grindstone, which, in its rapid rotation, throws upon their arms, face, and in fact all over them, a muddy shower, mixed with siliceous and metallic particles—clothed in garments constantly impregnated with damp, which they can only partially dissipate by means of highly heated stoves, whereby it is converted into steam,—they are, in addition to such exposure, compelled, at frequently recurring periods, to inhale the dry siliceous powder which flies off the stones, either during the process of dry grinding, or in turning down the surfaces of stones which have been unevenly worn away.

These workmen are consequently continually afflicted with diseases of the larynx, angina, chronic bronchitis, and, above all, pulmonary phthisis or consumption, which is transmitted from father to son.

From returns made of manufactories of steel weapons, it appears that out of fifty-six workmen who died between the years 1829 and 1841, forty-one had not worked more than twenty-five years. It is also remarked that a knowledge of the premature end which is destined to be their lot, tends greatly to demoralise them, and causes them to run into excesses which shorten still further their miserable existence. It is much the same in private workshops; the master of one of our first hardware manufactories having, in the space of four years, lost five of his best workmen from pulmonary consumption,

This lamentable state of things has often aroused the sympathies of the officers of artillery, who are entrusted with the supervision of the manufacture of arms. M. Belmont, the Director of a Division at Chatellerant, who was overtaken by death in 1841, in the midst of his useful enquiries, had proposed to substitute steel cylinders for the small stones. The experiments made by that officer, and continued after his decease, appear not to have led to sufficiently conclusive results, and were therefore abandoned. In 1842 another officer, proposed to introduce, in the manufacture of arms, the employment of the ventilator, which had already been tried with some degree of success in the workshops of Messrs. Piket, Paris. The object of this plan was to carry off the dust from the stones, and prevent its acting upon the workmen. This proposition, which was approved of by the Minister of War, was about to be tried, when M. Malbec suggested the use of grinding surfaces composed of gum-lac and sand, mixed whilst hot, furnishing a heavier dust, which would fall, and would not fly about the workshop as the stone does. The success of this process, which since 1843 was introduced into the manufactory of arms at Chatellerant, was the only thing that prevented the ventilator from being employed.

But although the use of these grinding surfaces appears advantageous in many cases, and especially for small sizes, yet the price of the substances, the novelty of their employment, which has not yet caused their preparation to be sufficiently general to be perfect, the necessity of treating with the patentee, and lastly, custom, are obstacles which will no doubt delay for a long time their general employment instead of stones; especially in departments in which, being near the quarries, stone may be easily and cheaply procured.

It is, therefore, very important to endeavour to diminish, if not entirely to do away with, the serious danger caused by the dust from the stone; and this has been attempted, apparently with success, by M. Jules Peugeot, one of the members of the firm of Peugeot, Japy, & Co., manufacturers of hardware, at Herimoncourt, Department of Doubs.

M. Peugeot wished to diminish, as much as possible, the chance and danger of breakage of the stones, to preserve the workmen from the wet thrown upon them by the revolutions of the grindstone, and principally to carry off the powder produced by dry grinding, or turning down stones which have been worn away.

The first object has already been effected in various ways, generally by mounting the stone in a different manner; that is to say, instead of keying the stone on a square shaft, it is compressed between two cast-iron plates, of suitable size, which compression is effected either by means of a shoulder on one side of the shaft, and a nut working on a threaded portion of the shaft on the other side, or by means of four bolts passing through the eye of the stone: this latter plan has been adopted by M. Peugeot. Both these plans have proved effective, as rupture of the stones has been much less frequent wherever they have been adopted.

As an additional security, and at the same time to defend the workman as much as possible from damp, M. Peugeot covers that part of the stone opposite the workman with a concentric shield, fastened to the ground by two strong chains, and which he calls a *safety cuirass.* This apparatus is intended, in case of rupture, to arrest the pieces which may fly off, and will be found effective when the pieces are small. It is perhaps to be feared, that it will not be sufficiently strong in case of rupture into two or three pieces, of a stone from four to six feet in diameter, making 200 or 300 revolutions per second; but however this may be, it is much to be desired that this apparatus should be employed, especially as there is no doubt of its utility, in receiving the wet and dirt thrown off the stone; and in this respect, it will materially contribute to the improvement of the health of the workman.

But the greatest improvement which M. Peugeot has effected, and to which the attention of the Academy is particularly directed, is the effective application of the ordinary ventilator to the purpose of carrying off the powder flying from the stone. We will give a concise idea of the simple arrangement which he has adopted, by briefly describing the establishment at Valentigney, in the district of Herimoncourt. This establishment contains:—

2	stones of	2m. 0 to 3m. 3	diameter, making	90	revolutions per second.
11	„	1m. 6	„ „	140	„ „
4	„	1m. 10	„ „	150	„ „

—

17 stones distributed in two parallel lines.[*]

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[*] The French metre is equal to 39.33 English inches.

The underneath parts of the stones are enclosed in cases, and connected with each of them is a small pipe, leading into a main channel cut under ground, and running at right angles to these several pipes; one main channel being for each row of stones.

The two long channels, thus formed, are united at one end, and communicate with an exhausting pipe leading to the centre of one side of a fan or ventilator, which is about two and a half feet in diameter, and one foot wide. This ventilator is mounted in a suitable case, and placed in front of an opening made in the wall of the building. When, therefore, the ventilating fan is put in to rotation, it will create a strong under draught, and draw down the floating particles of stone and cause them to pass along the conducting channels, and escape into the outer atmosphere.

As it is not necessary to produce an exhaustion under all the stones at once, because the greater part of them work with water, and only produce powder when their periphery is being dressed or turned down, the pipes are furnished with dampers for the purpose of cutting off the communication with the exhauster when not required. By this means, the cases of any one or more of the stones may be brought into communication with the exhauster, as desired.

For certain kinds of work dry grinding is always required, and for such work the stones are kept constantly ventilated. Four stones might be dressed or turned down at once, and the ventilator would carry off the pulverised stone; but it is better to turn down one only at a time.

A similar apparatus has been adopted by Messrs. Peugeot, Japy, and Co., at Terreblanche, and the health of their grinders has since been as good as that of other workmen.

If it were necessary to add anything on the score of humanity to induce the principals of establishments to adopt such a simple and economical apparatus in order to preserve a class of operatives from a premature death, I would add, that the economy effected in the wear and tear of the axles, bearings, and other parts of the machinery in the mill, by withdrawing the gritty particles floating in the air, will soon defray the expense of introducing the apparatus.—[*Ibid.*]

ON ELECTRICAL ACTION IN THE PROCESSES OF GILDING AND ZINCING.

BY M. SAINTE PREUVE.

In the processes of gilding by immersion in saline solutions, and coating iron with zinc, two facts are verified concerning the theory of electricity, which had not hitherto been clearly explained. Gilding is effected in the most advantageous manner with an alkaline bath, and zincing with an acid bath. These facts agree with the classification made by M. Berzelius, and the observations of M. Becquerel. According to M. Berzelius, gold is negative when in contact with copper; and according to M. Becquerel, gold is also negative when in contact with alkalies. There is, consequently, harmony between the two electrical actions, which is favorable to the deposit of gold in thin layers upon the copper.

In the same manner zinc is positive when in contact with iron; and contact with acids causes it to assume the same electric condition. There is therefore here also accordance between the two electric actions.

It does not, however, necessarily follow from these principles, that gilding and zincing can only be effected under the above conditions. Exceptional cases may in fact be produced, in which the gilding was effected in an acid or neutral bath; and zincing in an alkaline or neutral bath. It is, in fact, sufficient for the electrical action of the copper upon the gold, to be more powerful than that of the acid or neutral bath upon the gold; and for the electric action of the iron upon the zinc, to be more powerful than that of the alkaline or neutral bath upon that metal.

Lastly, owing to the intervention of the electric current of an electrical element (or even of a battery) the positive state which was produced by the acid bath in gilding may be converted into negative; and the negative state of the zincing bath into positive.—[*Ibid.*]

Scientific Adjudication.

COURT OF COMMON PLEAS.

July 1st, 1847.

Before Lord Chief Justice Wilde, and a Special Jury.

CROLL *v.* EDGE.

Counsel for the Plaintiff, Mr. Serjeant Channell:—for the Defendant, Mr. Serjeant Byles and Mr. Webster.

This was an action brought by the plaintiff, who is a superintendant of the Brick Lane Gas Works, against the defendant, a gasmeter manufacturer, for an alleged infringement of a patent granted 7th March, 1844, to the said plaintiff, conjointly with Mr. W. Richards.

The patent in question was for "improvements in the manufacture of gas for the purposes of illumination; and in apparatus used when transmitting and measuring gas or other fluids." The subject matters contained in the specification of this patent are, 1st. Making hydrogen gas by the decomposition of water, produced by the action of acid upon zinc; and combining the gas with the vapours of naphtha, or other suitable fluid, to give color to the light. 2nd. Improvements in arranging clay retorts in a furnace for making gas, by which they may be more effectually and economically heated than under the previous arrangements. 3rd. A mode of manufacturing clay retorts by means of hydrostatic or other pressure in moulds. 4th. The mode of constructing and arranging the movable partitions of dry gas-meters, so that the flexible connections of the diaphragms or plates shall only bend in one direction, in order to prevent friction; and also in the mode of constructing the arms and connecting-rods, which communicate the motions of the partitions to the central crank-shaft.

The alleged infringement by the defendant consisted in his so constructing dry gas-meters that the diaphragms which form the measuring-chambers will never, in their movements, pass the vertical line of the junction between the flexible parts of the diaphragms and the case of the meter.

Before going into any consideration of the alleged infringement, or of the validity of the plaintiff's claim to such peculiar mode of working flexible diaphragms, the counsel for the defendant called the attention of the Court to the fact of the plaintiff having taken a patent for certain things, and specifying other matters of a different kind, from which circumstance he argued that either the specification produced was not the specification of the particular patent in question, but of some other patent; or that certain subjects of invention were set out and claimed in the specification which were not embraced by or contemplated in the title of the patent.

The patent was for "improvements in the manufacture of gas for illumination, and in apparatus used when transmitting and measuring gas or other fluids." The specification described not only peculiarities in the manufacture of gas, and in the construction of gas-meters, but it also described, and specially claimed, peculiar modes of making clay retorts, by the use of moulds and hydrostatic pressure, such being no part of the process of manufacturing gas for illumination, nor of transmitting or measuring it. The clay retorts, made under this patent, might be used for manufacturing gas, and for various other purposes not connected with the subject of the patent; indeed, they formed a distinct feature of invention, not contemplated by the title of the patent. It was urged, that as well might a patentee of improvements in the means of conveying passengers and goods on railways claim, under his patent, peculiar machinery or apparatus for rolling or planing and straightening bars of iron for the formation of rails for railways.

Much discussion took place between the counsel, on both sides, as to the validity of this objection against the specification. The learned judge considered the question raised was—Whether the invention named in the patent had been specified. If it had, does the specification claim more than was named in the patent? If it does, the patent is not valid; for no more can be held than the patent comprises,—it is an improvement larger than that stated in the patent; the effect of which is to extend the patent beyond the original grant. It is not intended by the Crown to extend the right to things which may be applied to other and independent purposes.

After some further discussion between the counsel, on the view taken by the learned judge, the case was closed by an address from Serjeant Channel on behalf of the plaintiff, when the Lord Chief Justice gave the following decision:—

JUDGMENT.

The Lord Chief Justice.—It appears to me this patent is perfectly unaffected in all particulars except in the particulars in which the issue agitated has an effect on it. It strikes me, I own, that these objections are valid against the present specification. First of all, the declaration, it is true, sets out the patent in the title corresponding to the fact,—then it goes on to aver that, in pursuance of a condition or proviso in that patent, the party specified the invention which was comprised within that patent. And the first objection that is started is, that there is a plea which traverses that fact, whether the invention named in the patent has been specified. And the objection arises from the circumstance, not of any deficiency in the description of that part of the invention which is confessedly within the terms of the patent, but that the specification is alleged to seek to cover an invention beyond that which is protected by the patent. It is therefore said, that if the specification does in truth describe the patent invention, however it may go beyond that, on the issue whether *that* patent invention is described, the excess will not warrant a verdict in the negative. It does strike me that is not correct, because the improvement referred to in the patent must be considered for this purpose (in my apprehension) an entire improvement; and if there be added something important or substantial to that invention, as described in the specification, to that which is described in the patent, and which has for its object to give the patentee an exclusive right to the monopoly of something that is not in the terms of the patent, I think that excess has the effect of making it a different invention to that comprised in the patent, as the patent is for an entire invention, and the invention specified is entire; but being entire, it is more extensive and comprises something substantial and different from that in the patent. It would seem that the first objection which was made is under the plea that the patent invention had not been described; and it seems, that being a question of law, that I must direct a verdict for the defendant on that issue, for the improvement that is specified in the instrument that has been filed is an improvement larger and different from that comprised in the patent;—and it is larger in this respect. It is very difficult to account for how this alteration came to be made in the specification; I think, however, that although, taking the whole together there seems to be reasons for the alteration, and a use made of the alteration that would incline one to think it was designed and intentional; yet I think it possible that the person to whom it was entrusted to draw the recital part of the specification, that might be drawn by another and a different person from him who would draw the substantial part, the recital not being supposed to require that matter of science,—I think it possible that the person reading it might say it was an improvement in the manufacture of gas for the purpose of illumination, and in the apparatus used when transmitting,—I think that might have occurred. But used, when?—used how?—why "used therein," and he might think "therein" was necessary. Thinking to make it a little more complete he puts in that word, but it has this unfortunate coincidence, that it is an important addition to the title of the patent, and the use made, if it could be made use of designedly, would be to effect an alteration, coupled with the mode of using, which would have the effect of extending the monopoly beyond the patent. As far as we are concerned it is a matter of mere curiosity and speculation whether it was introduced by accident or by design:—the question before me is the legal effect as it now stands. The original patent was for an improvement in the manufacture of gas for the purpose of illumination, and for the apparatus used when transmitting and measuring gas. So that the only improvement in the apparatus of any importance in the patent, was in the manufacture of gas, and in the mode of transmitting and measuring it; but with respect to the words now to be found, and "in apparatus used therein," that has the effect of covering apparatus, not only what shall relate to the transmission and measurement of gas, but also to apparatus used therein. Now it certainly would be a novel principle to say, that if you were to take out an improvement in the manufacture of an article, that under that general form you might in your specification claim an indefinite number of machines, and the sole and exclusive right of making an indefinite number of machines, because you might use all those machines in the manufacture particularly referred to. It is not the intention of the Crown, I apprehend, nor the just effect of a patent for the improvement of a machine, that a man should include in the patent a separate and independent and distinct machine, as applicable to any other purpose, and to say that is the purpose of the particular patent. Though I think the observation may be correct, that improvements in a manufacture will, unless there be something to control it, probably give a monopoly, and no doubt it would, for some apparatus there introduced; yet whether the patent is intended to apply to an apparatus strictly applicable to the manufacture, or to cover a separate and independent apparatus applicable to many other purposes, must be collected from the whole. It may be, and I think my brother Channell's argument correct, that it would cover that apparatus, but looking at this specification, is it limited? When a party seeks a patent for a machine for the improvement of a manufacture, does he under that mean to cover and acquire protection for an apparatus for one of the means of improving that machinery, or does he mean to obtain a separate and distinct and independent monopoly for that apparatus in its entire state? To ascertain that we must look and see how he deals with it. He says, I will describe my invention, "and my invention relates first to a mode of manufacturing gas." If that includes the apparatus, you want no more. As you are not stating in detail, but merely the object of your improvement, you may be right. Your mode of manufacturing gas, and improving it, may be by means of a new apparatus, but is that the same apparatus you afterwards refer to? Here comes the other.—Having said, first of all, "my invention consists of a mode of manufacturing gas," he says, and, thirdly, "of a mode of manufacturing clay retorts." If you meant by your first, that is, your "mode of manufacturing," to include a mode of manufacturing clay retorts, why put it in again without going into detail? Have you not laid the grounds of your hereafter contending against the public—if any man attempt to make and sell clay retorts after the fashion you describe—have you not laid the grounds of saying, "I do not claim it as a mode of manufacturing gas; it is true it is applicable to that, but under a mode of 'manufacturing gas' I included a set of totally different things,—I put that claim under a separate, distinct, and independent head. It is true there might be something that would include a claim to a mode of manufacturing gas, but my claim is for a totally distinct thing, and, if you want to see where I claim a totally distinct thing, why look at my claim for a gas-meter. That is in the same position as the gas-retort. My fourth head is gas-metre,—my third gas-retort, and gas-retort can be made as well as gas-meter, as they are both used in the course of manufacturing the gas." Then it goes on to page 8, and when he comes there to the description of drawing "E," he says, "we will now describe the third part of our invention, which has for its object,"—what? making gas?—"which has for its object a mode of making retorts with hydrostatic or other pressure in moulds," and entirely omits that his object is the making of gas. He states here, my object is a "mode of making retorts," and is silent as to gas. Then, when he puts it as a separate and distinct head, and when he has separate drawings applicable to it, he says he will now describe the third part of his invention, and that third part of his invention has for its object a mode of making retorts; and that seems to confirm it, although it is true at the conclusion of the description of drawing "E," there is a line material for the plaintiff, as he says, "by this means very far superior clay retorts for making gas will be obtained;" but he puts forward his object as the making of retorts of a particular description, and then he says, when you have done it by means of that process you may improve the manufacture of the gas. Then comes the conclusion of it, in which he again not abandons anything he has before claimed, but for the purpose of explanation retaining, as I apprehend, all that he had claimed before,—not narrowing his claim, but going through a variety of other matters, he says, "we also claim the mode of making clay retorts for making gas, by employing moulds and an hydraulic or other suitable press, as described in respect to the drawing E." It seems to me, therefore, that certainly he described the retort as a distinct and substantial head of claim, and that the effect of the patent, according to its title, was to give him an improvement in the manufacture of gas, and in the apparatus used when transmitting and measuring gas, which he has proposed to describe. And he has now claimed to be entitled to the exclusive monopoly, under that grant, for an apparatus used for the making of gas, and used when gas is transmitted and measured, thereby extending the monopoly in that patent production to a matter beyond the original patent. I think, first of all, that he has in his declaration averred that he has, by his specification, duly described the invention protected by the patent—that the specification has introduced something greater and more extensive than the patent; and, therefore, that it is not in the language of the issue between the parties, a description of the patent invention, but of another and a larger. I think also that the specification has not complied with the proviso in the patent, and therefore that the patent is affected in legal validity by that circumstance. That the person who has so failed to do so was bound by the legal consideration of the proviso in the patent to specify the patent invention, that he might claim as much as the patent invention covered, and to let the public clearly see what it was he did mean to have covered by the patent. He has told the public, in effect,—I mean to have covered by the patent such and such things, and then he includes in them something that the patent does not warrant. I think by that he deceives the public as to what is the effect of the patent which he claims under; and by reason of the excess so claimed he affects his right, which he might have well protected by the specification being adapted to it. I think, as I have before said, that under the sixth plea the invention described is not the invention for which the patent was applied; and that the specification has avoided the plaintiff's right to the patent, because he has claimed more than he is entitled to. I do not advert to the authorities at large, as the matter will have to be considered hereafter. I have considered them thus far, coupled with my former recollection of them, which is not very limited or very narrow, as regards all the decisions on this subject; and I think, on the whole, the plaintiff should be called. That is the most convenient mode; as if you went on now and tried the other issues, and a new trial was granted on this particular point, you must come down again. There would be no means of going to a Court of Error without coming down again at double the expense. The better way will be for the jury to be discharged as to the other issues, and a nonsuit to be entered, subject to the right of the plaintiff to enter a verdict for him on such pleas as the defendant shall elect as the grounds on which my judgment proceeded.

Mr. Serjeant Channell.—Therefore there will be a verdict for the plaintiff, on the 4th, 6th, and 7th pleas.

The Lord Chief Justice.—For the defendant.

Mr. Serjeant Byles.—On the 4th, 6th, and 7th issues; and the jury will consequently be discharged on all the other issues.

Mr. Serjeant Channell.—With leave for me to move to enter a verdict for the plaintiff on those issues, damages forty shillings, as the Court shall determine.

Mr. Serjeant Byles.—No, no damages.

Mr. Serjeant Channell.—Yes, we must have damages, forty shillings.

The Lord Chief Justice.—It will be the same thing. You have in substance that, if the Court gives you leave to enter the verdict for the plaintiff.

Mr. Serjeant Byles.—That is not so, with deference; my friend is supposing we should come down again;—the judgment of the Court of Error can only decide this point.

The Lord Chief Justice.—It will decide the validity of the patent.

Mr. Serjeant Byles.—If that is decided one way, we shall never come down again;—if it is decided for my friend, he is not entitled to damages. We should come down again to try the other issues. It may be that we may have a good defence behind.

The Lord Chief Justice.—If the verdict is for the plaintiff, the cause must return again, unless you mean to question that decision in a Court of Error. As it would be idle, supposing when the cause came down again, and the judge who presided here ruled according to the directions of the Court, that you should then tender a bill of exceptions, as that would be in fact to come down a second time to go to a Court of Error, and then you would have to come down a third time, if you succeeded on the bill of exceptions.

Mr. Serjeant Byles.—I am afraid I dont succeed to make myself understood; if the ultimate decision of a Court of Error is against me, it would go no further than a *venire de novo*, as I should have a right to try those other issues.

The Lord Chief Justice.—Certainly.

Mr. Serjeant Byles.—Then there cannot be damages,—and if it is for me there cannot be damages. If it is against me there can be no more than a *venire de novo*, as these persons have not tried the patent.

The Lord Chief Justice.—There must be, for the purpose of the bill of exceptions, some damages; it may be without prejudice.

Mr. Serjeant Byles.—I dont understand that, my Lord.

The Lord Chief Justice.—Yes, that has been done in other cases. Verdict for the plaintiff forty shillings, with liberty to tender a bill of exceptions:—if the judgment is reversed on the bill of exceptions, a *venire de novo*.

Mr. Serjeant Byles.—Verdict for me on those three issues.

The Lord Chief Justice.—Yes, verdict for the defendant here; verdict for the plaintiff in *banco*, with forty shillings damages.

Mr. Serjeant Byles.—In the event of the Court being for him.

The Lord Chief Justice.—Yes, subject to their ruling. If that judgment should be affirmed in error, should it go there, a *venire de novo* to be had.

Mr. Serjeant Byles.—That is it my Lord.

Mr. Serjeant Channell.—Will your Lordship certify, that in this case it was necessary to have a special jury.

The Lord Chief Justice.—Yes. Gentlemen, these matters involve a good deal of intricacy, which is much better to be considered more deliberately than it can be here. When we see a number of gentlemen remaining here from their business, for us to occupy the remainder of to-day, and possibly to-morrow, in discussing legal subjects which can better be considered elsewhere, is a great pity. From the course the case has taken, the parties will leave the validity of the patent to be decided here, if really the dispute between the parties is, whether it is a novelty; but probably the whole dispute between the parties will be as to the legality of the patent. That will occupy some time; and, therefore, it is not necessary for us to come to a conclusion here. You will now find your verdict for the defendant, and the arrangement will then be carried into effect, which the parties have agreed to.

A verdict was therefore found for the defendant on the 4th, 6th, and 7th issues,—the jury being discharged as to the others.

Nisi Prius.—Before the Chief Justice and a Special Jury.

July 2nd, 1847.

BEARD *v.* EGERTON AND ANOTHER.

This was an action for the infringement of a patent for an invention or discovery known by the name of the Daguerreotype.—Sir F. Thesiger, Mr. Robinson, and Mr. Webster appeared for the plaintiff, and Mr. Watson and Mr. Brown for the defendant.

It will be remembered, that this patent, which has been a most fruitful source of litigation, was assigned to the plaintiff by the patentee Mr. M. Berry, to whom the invention had been communicated in the month of July, 1839, by Messrs. Louis Jacques Daguerre and Joseph Isodore Niepce, from whom the French Government had purchased the invention for the benefit of that country. In the course of the same year, 14th August, 1847 (some days prior to the date of the exposition of the said invention or discovery to the French Government by Messrs. Daguerre and Niepce, according to the terms of their agreement), Berry obtained a patent for the exclusive use of the same within this kingdom. The Daguerreotype process, as described in the specification of the patent,* is divided into five operations, as follow:—The first consists in polishing and cleaning the silver surface of the plate, in order properly to prepare or qualify it for receiving the sensitive layer or coating upon which the action of the light traces the design; 2nd, in submitting the polished surface of the plate to the vapour of iodine (in a dark place) until a golden color is obtained on the plate; 3rd, in submitting, through the medium of the camera-obscura, the prepared surface or plate to the action of the light, so that it may receive the image; 4th, in bringing out, or making appear the image, picture, or representation, which is invisible when the plate is removed from the camera-obscura, by submitting the plate (in a dark place) to the action of the vapour of mercury; 5th, in removing the sensitive layer or coating of iodine, which would continue to be effected by, and undergo different changes from, the action of the light, by washing the plate in a solution of salt or hyposulphate of soda.

In answer to the declaration of infringement the defendants entered fifteen pleas, to the effect that no such patent existed,—that it was void from prior knowledge of the invention,—that it was public property by purchase of the French Government,—that the title and description was bad in law;—and that the invention was of no public benefit or advantage.

Mr. Butler, an anatomical modeller, Mr. Cooper, Dr. Ryan, Professor Brandt, and other scientific witnesses, were called for the plaintiff. It was shewn, that a material part of the invention, as described in the specification, consisted in the use of iodine for producing the sensitive coating on the plates, and that the same material (with the addition of chloride of iodine, or chlorine, and bromide of iodine, or bromine) was used in the process adopted by the defendant. It was also proved that the defendants had received money for instructing persons in the art of using the Daguerreotype. It was further proved, that the directions given in the specification for obtaining Daguerreotype pictures were ample and clear; the invention being divided under five heads or operations, as above expressed. At the close of the plaintiff's case, Mr. Watson took various objections to the title of the patent, and to certain terms in the specification. The only question, however, entertained by the learned judge, arose upon the construction to be put on the words which occurred after describing the mode of polishing the plates previous to their receiving the iodine or sensitive coating. The passage is as follows:—"It is however considered indispensable, that just before the moment of using the plates in the camera, or the reproducing the design, to put, at least once more, some acid on the plate, and to rub it lightly with pounce, as before stated." The learned counsel contended that these words were calculated to mislead a person of ordinary understanding, inasmuch as it appeared from the evidence of one of the witnesses, that the effect of applying the acid and pounce "the moment before using the plates" would be to destroy the sensitive surface produced by the iodine.

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* For description of this invention, see Vol. XVI., p. 1, Conjoined Series.

His lordship held this objection to be valid, on the ground that although a skilful person might see that the patentee did not intend the words (as to the precise time of using the acid) to be so minutely construed, yet the description was such as to make the specification insufficient according to the ordinary application of the language. The public was not obliged to read the whole of the specification in order to discover a modified meaning for a particular passage or expression. A person in a situation to use the invention should be enabled to understand the specification without being called upon to apply any reasoning as to the construction of the terms used; for reasoning upon chemical subjects is quite out of the question. The jury were accordingly directed to find a verdict for the defendant on the twelfth plea, which raised the objection named; and for the plaintiff, damages 40*s*., upon the pleas which went to the granting of the patent, the novelty of the invention, the infringement, &c. Leave to move was reserved on both sides.

LIST OF REGISTRATIONS EFFECTED UNDER THE ACT FOR PROTECTING NEW AND ORIGINAL DESIGNS FOR ARTICLES OF UTILITY.

1847.

June 29. *John Masters*, of Welford-place, Leicester, for a waistcoat back strap.

29. *Henry Barber*, of Davis-street, Oxford-street, for a double-bottomed pan for a shower-bath.

July 2. *Frederick Ayckbourn*, of 30, Palace New-road, for a float life preserver and swimming belt.

3. *Edward Colsell Rose*, of Northfleet, Kent, for a circular domestic telegraph.

July 3. ***Alexander Austin, Thomas White, & Henry Francis,*** of 4, Pleydell-street, Fleet-street, London, for an envelope.

5. ***John Bartlett & Son,*** of 3, Welch Back, Bristol, for a spring sugar mill.

5. ***Francis Builden Oerton,*** of Walsall, for an improved shaft bearer and buckle.

6. ***William Hunt & Sons,*** of Brades-street Works, near Birmingham, for an improved draining tool.

6. ***John Jones,*** of 106, London-wall, for a washing machine.

6. ***Charles Phillips,*** of Atherstone, for a hat ventilator.

7. ***James Dredge,*** of Bath, civil engineer, for a balanced bracket girder for bridges, viaducts, &c.

8. ***Harrild & Sons,*** of 22, Friday-street, Cheapside, for a bookbinder's plough.

10. ***Sydney Smith,*** of Willenhall, for a spindle for door knobs.

10. ***Francis Henry,*** of Willenhall, for a bolt.

12. ***Anthony Binns,*** of Ocean-row, Stepney, for horizontal tidal shifting steps for piers.

12. ***Deane, Dray, & Deane,*** of Arthur-street East, London Bridge, for a grain, spice, and seed cleanser, sifter, and polisher.

13. ***Thomas Henry Masters,*** of 8, York-street, St. James's-square, London, for a tobacco supplyer.

13. ***Alexander Haig,*** of 52, Smith-street, Jubilee-place, Stepney, for a portable forge.

14. ***William Palmer,*** of Sutton-street, Clerkenwell, for a glass holder of a candle lamp.

15. ***Charles Gillett,*** of Bristol, manufacturer, for a universal cravat fastener.

15. ***William George Bentley,*** of 234, High Holborn, London, for an anti-evaporation blacking apparatus.

17. ***A. & M. Burton,*** of Holland-street, Blackfriars, engineers, for an effluvium flap or valve for drains.

17. ***Welch, Margetson, & Co.,*** of 134, Cheapside, London, for an elastic mourning band.

17. ***James Thornton,*** of Waterford, architect, for an improved jaunting car.

17. ***Samuel Messenger,*** of Birmingham, for a railway carriage roof lamp.

17. ***Barrett, Exall, & Andrewes,*** of Katesgrove Iron Works, Reading, for feed-gear to chaff-cutters.

19. ***William Hyatt,*** of 34, Plummer-street, City-road, engineer, for apparatus for regulating the supply of water to the condensers of steam-engines.

July 19. *James Milne & Son*, of Edinburgh, brass founders, &c., for an improvement on gas-meters.

20. *James Davis*, of King-street, Frome, Somersetshire, for a balanced valve gulley trap, to prevent the ascent of noxious vapours from sewers and drains.

20. *Keith Imray, M.D.*, of Devonshire-street, Portland-place, London, for a pessary for the relief of *prolapsus uteri*, or *prolapsus ani*.

21. *John William Phelps, M.D.*, of Cheapside, London, for an improved spiral abdominal supporter for *prolapsus uteri*.

23. *Walter Neilson & William Tait*, of Hyde Park Foundry, Glasgow, engineers, for a railway wheel spoke bending machine.

24. *James Buchanan*, of 49, West George-street, Glasgow, sharebroker, for a ventilating case for wet umbrellas inside railway carriages.

24. *Philemon Augustin Morley*, of Birmingham, for an iron hoop for sugar moulds.

24. *John Cole*, of 6, Bridge-street, Boston, Lincolnshire, gun maker, for an improved breech for fire-arms.

26. *Thomas Saddleton Reeler*, of 27, Cornwall-place, Brecknock-place, Camden-town, for an invisible raising screw for music stools, and other articles of furniture.

27. *Griffiths & Hopkins*, of Birmingham, for an economic roasting, baking, and warming apparatus.

28. *Phillipp Henry Broadhurst*, of 75, Spring-lane, Sheffield, and *John Wood*, jun., of 110, Rockingham-street, Sheffield, manufacturers, for a shoe sad iron.

List of Patents

That have passed the Great Seal of IRELAND, from the 17th June to the 17th July, 1847, inclusive.

To Alexander Bain, of Hanover-street, Edinburgh, electrical engineer, for certain improvements in transmitting and receiving electrical telegraphic communications, and in apparatus connected therewith.—Sealed 21st June.

Richard Turner, of Hammersmith Works, Dublin, and Bath-place, New-road, in the county of Middlesex, wrought-iron manufacturer, for an improvement in the construction of roofs of railway stations, and roofs and floors of other buildings.—Sealed 28th June.

Charles Richardson, of Dalston, in the county of Middlesex, Gent., for certain improvements in making and refining sugar, and in the application of the products of the sugar-cane to manufacturing purposes, and also in the machinery and apparatus employed therein,—being a foreign communication.—Sealed 2nd July.

List of Patents

Granted for SCOTLAND, subsequent to June 22nd, 1847.

To William Darling, of Glasgow, ironmonger, for improvements in moulding, and in the manufacture of certain articles of cast iron.—Sealed 23rd June.

Thomas Craddock, of Birmingham, engineer, for improvements in steam-engines and boilers, and in machinery connected therewith.—Sealed 23rd June.

Clemence Augustus Kurtz, of Manchester, manufacturing chemist, for certain improvements in the mode of preparing and using indigo in the dyeing and printing of woollen, cotton, and other fabrics.—Sealed 29th June.

Clemence Augustus Kurtz, of Manchester, manufacturing chemist, for a new manufacture of certain coloring-matter, to be used in dyeing, or in the printing of woollen, cotton, silk, and other fabrics.—Sealed 29th June.

William Knowelden, of Great Guildford Street, Southwark, engineer, for improvements in steam-engines.—Sealed 30th June.

John Shaw, of Blackburn, manager, for certain improvements in machinery or apparatus for carding, drawing, slubbing, and roving cotton, wool, and other fibrous substances.—Sealed 2nd July.

Paul Gilbert Prelier, of Rue de Rivoli, Paris, for improvements in the manufacture of dry sulphuric acid, and in the manufacture of smoking or nordhausen sulphuric acid,—being a foreign communication.—Sealed 9th July.

George Winslow, now of Boston, in the State of Massachusetts, United States of America, merchant, but late of Burton Crescent, London, for improvements in machinery for manufacturing files and rasps,—being a foreign communication.—Sealed 12th July.

John Law, of York-place, Portman-square, London, for improvements in yarns, and in the machinery by which the same are manufactured,—being a foreign communication.—Sealed 13th July.

William Edward Newton, of the Office for Patents, 66, Chancery Lane, London, for improvements in the manufacture of screws,—being a foreign communication.—Sealed 19th July.

Henry John Nicoll, of No. 114, Regent Street, London, tailor, for improvements in garments, and in pockets, bags, and other receptacles.—Sealed 19th July.

Edward Slaughter, of Avonside Ironworks, Bristol, engineer, for improvements in locomotive-engines.—Sealed 20th July.

William Broadbent, of Manchester, and of Little Lever, in the County of Lancaster, paper manufacturer and dealer, for improvements in the manufacture of paper.—Sealed 21st July.

James Johnstone, of Willow Park, Greenock, for certain improvements in the manufacture of sugar.—Sealed 21st July.

William Breynton, of the Inner Temple, London, for certain improvements in rotatory steam-engines, and in the means of working the same.—Sealed 21st July.

Egbert Hedge, formerly residing at No. 7, Howard-street, St. Clement's Danes, London, now residing at the Commercial Hotel, Blackfriars-road, London, for certain improvements in rails for railways, and in the manner of securing them.—Sealed 22nd July.

New Patents

SEALED IN ENGLAND.

1847.

To Frederick Chaplin, of Bishops Stortford, Hertfordshire, tanner, for improvements in wheels of railway carriages. Sealed 29th June—6 months for inrolment.

Thomas Young, of Queen-street, Cheapside, merchant, for improvements in card-cases, and retaining or fastening papers, deeds, and fabrics. Sealed 29th June—6 months for inrolment.

Paul Gilbert Prelier, of Rue de Rivoli, Paris, Gent., for improvements in the manufacture of dry sulphuric acid, and in the manufacture of smoking or nordhausen sulphuric acid,—being a communication. Sealed 29th June—6 months for inrolment.

Joseph Brown Wilks, of Chesterfield Park, Essex, Esq., for improvements in the manufacture of oil from certain nuts, from which oil has not been before manufactured, and producing a vegetable substance; and the application thereof for the purpose of affording light, and other uses. Sealed 3rd July—6 months for inrolment.

Eliza Tonge, of Boston, in the county of Lincoln, for improvements in ornamenting glass. Sealed 3rd July—6 months for inrolment.

Robert Weare, of Argyle-street, Birkenhead, in the county of Chester, watch and clock maker, for improvements in clocks or time-keepers. Sealed 3rd July—6 months for inrolment.

Alexander Mitchell, of Brickfields, in the parish of Ballymacarrell, in the county of Down, in the kingdom of Ireland, civil engineer, for an extension of letters patent granted to him by His late Majesty King William the 4th, dated the 4th day of July, in the 4th year of his reign, for the full term of 14 years, from the 4th day of July, 1847, for his invention of a dock, of improved construction, to facilitate the repairing, building, or retaining of ships and other floating vessels; and that certain parts, employed in the construction of the said dock, of his invention, are also applicable to other purposes.

George Alexander Miller, of Piccadilly, Middlesex, for improvements in lamps. Sealed 3rd July—6 months for inrolment.

George Augustus Hudddart, of Brynker, in the county of Carnarvon, Esq., for certain improved apparatus for the cultivation of land. Sealed 3rd July—6 months for inrolment.

John Hunt, of Birmingham, brass-founder, for a certain improvement or certain improvements in effecting the combustion of gas, oil, camphine, and other substances, which are or may be burned for the production of light. Sealed 3rd July—6 months for inrolment.

Jeremiah Brown, of Kingswinford, in the county of Stafford, roll-turner, for certain improvements in rolls, and machinery used in the manufacture of iron; also in rolls and machinery for shaping or fashioning iron for various purposes. Sealed 3rd July—6 months for inrolment.

John Ray, of Albion-terrace, Commercial-road East, coal merchant, for improvements in constructing or fitting the interior parts of ships or other vessels, warehouses, and other depôts, for the purpose of facilitating the delivering or removing from such ships, vessels, warehouses, and other depôts, of the car-goes or contents thereof. Sealed 3rd July—6 months for inrolment.

William Edwards Staite, of Lombard-street, city, Gent., for certain improvements in lighting, and the apparatus or apparatuses connected therewith. Sealed 3rd July—6 months for inrolment.

Theodore Claeys, of Ostend, in the kingdom of Belgium, mechanician, and Louis François Strand, of the same place, Gent., for improvements in the manufacture of various articles from cork. Sealed 3rd July—6 months for inrolment.

John Carr, of Blackburn, in the county of Lancaster, manager, for certain improvements in looms for weaving. Sealed 3rd July—6 months for inrolment.

George Winslow, now of Boston, in the state of Massachusetts and United States of America, merchant, for improvements in machinery for manufacturing files and rasps,—being a communication. Sealed 3rd July—6 months for inrolment.

Edmund Wheeler, of Basingstoke, in the county of Hampshire, ironmonger, for improvements in valves for steam and other engines,—being a communication. Sealed 3rd July—6 months for inrolment.

John Harvey Sadler, of Holbeck, Leeds, Scotch iron merchant, for improvements in constructing bridges, aqueducts, and similar structures. Sealed 7th July—6 months for inrolment.

Samuel Stokes, of Monkwell-street, in the city of London, carpenter, for an improved machine for tracing or engraving from solid bodies, or subjects in relief. Sealed 10th July—6 months for inrolment.

Robert William Sievier, of Henrietta-street, Cavendish-square, Middlesex, Gent., for an improved material or materials for purifying or decolorizing bodies, which material or materials may also be employed as manure and pigments, and for other like purposes. Sealed 12th July—6 months for inrolment.

William Edward Newton, of the Office for Patents, 66, Chancery-lane, Middlesex, civil engineer, for certain improvements in the manufacture of screws,—being a communication. Sealed 12th July—6 months for inrolment.

William Langley Beal, of Whitstable, in the county of Kent, smith, for improvements in the construction of anchors. Sealed 13th July—6 months for inrolment.

Alfred Vincent Newton, of the Office for Patents, 66, Chancery-lane, mechanical draughtsman, for certain improvements applicable to locomotive engines and carriages employed on railways,—being a communication. Sealed 13th July—6 months for inrolment.

Henry Bessemer, of Baxter House, Old St. Pancras-road, Middlesex, engineer, for improvements in the manufacture of plates, sheets, or panes of glass. Sealed 17th July—6 months for inrolment.

William Hensman, of Woburn, Bedfordshire, agricultural implement manufacturer, for certain improvements in thrashing machines. Sealed 17th July—6 months for inrolment.

Pierre Armand le Comte de Fontainemoreau, of 4, South-street, Finsbury, for certain improvements in machinery for preparing cotton and other fibrous substances,—being a communication. Sealed 17th July—6 months for inrolment.

William S. Henson, of 27, New City Chambers, in the city of London, for certain improvements in the construction of razors for shaving. Sealed 17th July—6 months for inrolment.

John Sykes and Adam Ogden, both of Huddersfield, Yorkshire, wool-cleaners and machine-makers, for improvements in machinery for cleaning wool, cotton, and similar fibrous substances from burs, motes, and other extraneous matter. Sealed 17th July—6 months for inrolment.

Robert William Sievier, of Henrietta-street, Cavendish-square, Middlesex, Gent., for improvements in stamping, marking, cutting, embossing, or printing. Sealed 17th July—6 months for inrolment.

Bernhard Von Rathen, of Putney, Surrey, civil engineer, for certain universal wheels or improved direct rotatory engines, to be worked by steam, air, or any other elastic power. Sealed 17th July—6 months for inrolment.

Edward Slaughter, of Avon-Side Iron Works, Bristol, engineer, for improvements in locomotive engines. Sealed 19th July—6 months for inrolment.

Edward Light, of Esther-terrace, Bermondsey, Surrey, master mariner, for improvements in apparatus for supporting or bueying up persons, boats, and other bodies when in the water. Sealed 19th July—6 months for inrolment.

James Whitley, of Botany, in the township of Morton, in the parish of Bingley, Yorkshire, spinner, for certain improvements in the mode of washing, scouring, and drying of wool, alpaca, mohair, cotton, and other fibrous substances. Sealed 19th July—6 months for inrolment.

Joseph Tall, of Brixton, in the county of Surrey, builder, for improvements in apparatus for setting saws. Sealed 19th July—6 months for inrolment.

John James Chidley, of Aldersgate-street, city, publisher, for improvements in printing-presses. Sealed 19th July—6 months for inrolment.

Joseph Jean Baranowski, of No. 3, Rue Neuve Clichy, Paris, Gent., for a ready-reckoning machine. Sealed 19th July—6 months for inrolment.

Louis Dominique Girard, of Paris, engineer, for improvements in hydraulic apparatus; part of these improvements are applicable to air apparatus. Sealed 20th July—6 months for inrolment.

Barnabas Daft, of Dover-terrace, Green Heys, Manchester, for improvements in the manufacture of elastic fabrics and articles. Sealed 20th July—6 months for inrolment.

William Burch, of Newcastle-place, Clerkenwell Close, Middlesex, Gent., for improvements in railways, in carriages to be used on railways, and in giving signals on railways. Sealed 20th July—6 months for inrolment.

Moses Poole, of the Bill Office, London, Gent., for improvements in the manufacture of cast metal, iron, and steel. Sealed 20th July—6 months for inrolment.

Harry Joseph Perlbach, of Hamburgh, but now residing in Aldersgate-street, city, founder, for an improved method or methods of uniting certain metals and alloys of metal. Sealed 23rd July—6 months for inrolment.

John Lewthwaite, of Halifax, Yorkshire, Gent., for certain improvements in numbering machines. Sealed 23rd July—6 months for inrolment.

Henry Samuel Rayner, of Ripley, in the county of Derby, civil engineer, for certain improvements in propelling on land and on water. Sealed 23rd July—6 months for inrolment.

John Platt, of Oldham, in the county of Lancaster, machine-maker, and Thomas Palmer, of the same place, mechanic, for certain improvements in machinery or apparatus for making cards; also for preparing and spinning cotton and other fibrous materials; and for preparing and dressing yarn, and weaving the same. Sealed 24th July—6 months for inrolment.

Charles De Bergue, of Arthur-street West, city of London, engineer, for improvements in buffing and traction apparatus, and in springs for railway and other carriages. Sealed 26th July—6 months for inrolment.

John Hastie, of Greenock, in Scotland, engineer, for improvements in the application of steam-power to turn certain kinds of mills or machines with continuous rotatory motion. Sealed 29th July—6 months for inrolment.

William Edward Kyan, of Bark-place, Bayswater, Middlesex, clerk, for improvements in consuming the smoke and economizing the fuel of steam-engines, breweries, and manufactories generally,—being a communication. Sealed 29th July—6 months for inrolment.

Alfred Ceal, of Aldgate, manufacturer, and Henry Bear, of New-road, manufacturer, for improvements in the manufacture of tobacco. Sealed 29th July—6 months for inrolment.

William Baines, of Norwich, inspector of railways, for improvements in the manufacture of parts of railways, and in the bearings of machinery, and in apparatus used in constructing railways. Sealed 29th July—6 months for inrolment.

Joseph Paul, of Thorp Abbotts Hall, Norfolk, farmer, for improvements in cutting or forming drains in land, and for raising subsoils to the surface of land. Sealed 29th July—6 months for inrolment.

Stopford Thomas Jones, of Stamford-street, Surrey, Lieutenant in Her Majesty's service, for improvements in steam-engines, and in machinery for propelling vessels. Sealed 29th July—6 months for inrolment.

Francis Starr, of Warwick, in the county of Warwick, for a new jet for the delivery of water and other fluids, which he styles the Protean jet. Sealed 29th July—6 months for inrolment.

George Witherell, of New York, America, for improvements in manufacturing or working iron for various useful purposes,—being a communication. Sealed 29th July—6 months for inrolment.

James Morison, of Paisley, shawl manufacturer, for improvements in applying power in propelling or moving carriages, and in giving motion to machinery. Sealed 29th July—6 months for inrolment.

William Phillips Parker, of 48, Lime-street, City, Gent., for an improved mode of manufacturing cigars,—being a communication. Sealed 29th July—6 months for inrolment.

CELESTIAL PHENOMENA FOR AUGUST, 1847.

D.	H.	M.	
1			Clock before the ☉ 6m. 3s.
			☽ rises 9h. 55m. A.
			☽ passes mer. 3h. 45m. M.
			☽ sets 10h. 17m. M.
	12	4	♅ in conj. with the ☽ diff. of dec. 0..6. S.
2	6	50	♂ in conj. with the ☽ diff. of dec. 1. 36. S.
3	1	59	☽ in □ or last quarter
	16	15	♃'s first sat. will im.
5			Clock before the ☉ 5m. 45s.
—			☽ rises Morn.
—			☽ passes mer. 7h. 19m. M.
—			☽ sets 3h. 6m. A.
7	12	7	♃ in conj. with the ☽ diff. of dec. 4. 59. N.
8	2	41	☿ greatest hel. lat. S.
	14	15	♃'s second sat. will im.
10			Clock before the ☉ 5m. 10s.
—			☽ rises 4h. 11m. M.
—			☽ passes mer. 11h. 36m. M.
—			☽ sets 6h. 51m. A.
10	3	35	☿ in conj. with the ☽ diff. of dec. 0. 8. S.
11	0	23	Ecliptic conj. or ● new moon
14	9	44	♀ in conj. with the ☽ diff. of dec. 2. 18. S.
	15		☽ in Apogee
15			Clock before the ☉ 4m. 21s.
—			☽ rises 9h. 27m. M.
—			☽ passes mer. 3h. 14m. A.
—			☽ sets 8h. 52m. A.
17			Mercury R. A. 8h. 46m. dec. 14. 59. N.
—			Venus R. A. 12h. 21m. dec. 5. 37. S.
—			Mars R. A. 2h. 18m. dec. 10. 35. S.
—			Vesta R. A. 14h. 0m. dec. 7. 11. S.
—			Juno R. A. 18h. 38m. dec. 7. 54. S.
—			Pallas R. A. 7h. 17m. dec. 3. 20. S.
—			Ceres R. A. 8h. 40m. dec. 23. 25. N.
17	—		Jupiter R. A. 6h. 48m. dec. 22. 52. N.
	—		Saturn R. A. 22h. 51m. dec. 9. 24. S.
	—		Georg. R. A. 1h. 7m. dec. 6. 27. N.
	—		Mercury passes mer. 23h. 2m.
	—		Venus passes mer. 2h. 39m.
	—		Mars passes mer. 16h. 36m.
	—		Jupiter passes mer. 21h. 5m.
	—		Saturn passes mer. 13h. 8m.
	—		Georg. passes mer. 15h. 24m.
17	2	12	☿ stationary
19	5	1	☽ in □ or first quarter
	14	31	♃'s first sat. will im.
20			Clock before the sun 3m. 18s.
	—		☽ rises 2h. 34m. A.
	—		☽ passes mer. 7h. 5m. A.
	—		☽ sets 11h. 35m. A.
24			Occul. z1 Aquarii, im. 8h. 12m.
	—		Occul. z2 Aquarii, im. 8h. 10m. em. 9h 3m.
25			Clock before the ☉ 2m. 2s.
	—		☽ rises 6h. 22m. A.
	—		☽ passes mer. 11h. 43m. A.
	—		☽ sets 3h. 52m. M.
	—		Occul. θ Aquarii, im. 17h. 10m. em. 18h. 3m.
	9	31	☿ greatest elong. 18. 17. W.
	23	29	♀ in Aphelion
26	6	9	Ecliptic oppo. or ○ full moon
26	9	35	♄ in conj. with the ☽ diff. of dec. 4. 52. S.
	16	25	♃'s first sat. will im.
27			☽ in Perigee
27	2	10	☿ in the ascending node
27	13	17	♀ at greatest brilliancy
	13	33	♃'s third sat. will im.
	16	30	♃'s third sat. will em.
28	18	56	♅ in conj. with the ☽ diff. of dec. 0. 1. N.
	—		Occul. ε Piscium, im. 16h. 48m.
30	9	41	♂ in conj. with the ☽ diff. of dec. 0. 25. S.
	15	56	♃'s fourth sat. will im.
	17	8	♃'s fourth sat. will im.
31	15	45	☿ in Perihelion

J. LEWTHWAITE, Rotherhithe.

THE
LONDON JOURNAL,
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CONJOINED SERIES.

No. CLXXXIX.

RECENT PATENTS.

To John Tatham, *of Rochdale, in the county of Lancaster, machine maker,* David Cheetham, *of the same place, machine maker, and* John Wallace Duncan, *of Manchester, in the same county, Gent., for certain improvements in machinery or apparatus to be used in the preparation and spinning of cotton and other fibrous substances.*—[Sealed 29th June, 1846.]

This invention applies, firstly, to the "scutcher" or "lap-machine," which is employed for the purpose of cleansing the cotton or other fibrous material, and lapping it in a compact and even sheet or lap upon a roller, preparatory to its being fed into the carding-engine; and consists in a new arrangement of rollers for compressing or calendering the sheet of cotton or other fibrous material, previous to its being lapped upon the roller; and also in a new method of weighting the calendering rollers, whereby the pressure is gradually increased, as the sheet of cotton or other fibrous material approaches the lap. The second part of the invention consists in the employment or use of an apparatus for the purpose of collecting the short fibres of cotton or other fibrous material from the dust which is blown by the fan from the scutcher or lap-machine.

The third part of the invention is an improvement upon machinery, which forms the subject of a prior patent, granted to Messrs. Tatham and Cheetham, 14th March, 1844. It consists in causing the "sliver" to be twisted, as it is delivered from the carding-engine or other preparation machinery into the tin-can or other receptacle employed.

The fourth part of the invention relates to machinery or apparatus used in preparing and spinning cotton and other fibrous substances; and consists in the application of "gutta-percha" and "tin-towa," for covering rollers used in the several machines usually employed in such operations. These substances may be used either alone or in combination with caoutchouc, sulphur, sulphurets, chloride of sulphur, gum resins, leather, fibrous materials, cork-dust, French chalk, oxides of metals, or other suitable compounds. These roller-covers, formed of gutta-percha and its suitable combinations, may be put upon the rollers in the manner usually practised in covering such rollers with leather.

The fifth part of the invention relates to the "flyer," now usually employed in "presser-frames."

In Plate IV., fig. 1, represents a longitudinal section of a scutcher or lap-machine, with the first part of the improvements applied thereto. *a, a,* is the main framing of the machine; and *b, b,* the endless travelling "lattice" or feed-cloth, by which the cotton or other fibrous material is carried to the pairs of fluted feed-rollers *c, c,* and *d, d.* After passing between these rollers, it comes under the operation of a rotating beater *e, e,* which opens the fibres of the cotton, &c., and allows the dirt to fall through the grate or grid *f.* The cotton then proceeds along the grid or grate *f,* and falls upon the endless travelling lattice or wire-cloth *g,* which carries it forwards to the wire-cylinder or cage *h.* This cage or cylinder *h,* is caused to revolve, and a strong current of air is passed through it by means of a rotary fan or other exhausting medium, which will draw the dust through the wire cylinder, and cause the cotton or other fibrous material to be laid upon the surface of the same in a sheet, which the revolution of the cylinder will deliver again on to the endless travelling lattice or wire-cloth *g*, whereby it will be carried onwards to the calendering apparatus. This apparatus consists of four or more small rollers *i*, *i*, *i*, placed upon or around a larger roller or cylinder *k*, and weighted in such a manner, that the pressure shall progressively increase as the sheet of cotton or other fibrous material proceeds to the lap-roller *l*, upon which it is wound by friction of contact with the fluted bed-rollers *m*, *m*. The roller or cylinder *k*, is caused to revolve in the direction of the arrow, and has a spur-wheel upon one end, which takes into four spur-pinions, fixed upon the ends of the rollers *i*, *i*, *i*; thus driving them all in the same direction. The method which is most preferred by the patentees for weighting the upper calendering-rollers is shewn in the detached view, fig. 2. *n*, is a lever, having its fulcrum at *o*, and carrying a weight *p*, at or near its other extremity. This lever *n*, has one end of a small band or chain *q*, fixed to it, which, after passing alternately over and under the pullies *r*, *r*, *r*, (upon the ends of the rollers *i*,) and the carrier-pulleys *s*, *s*, *s*, is attached at its other extremity to the framing *a*, of the machine; thus it will be evident that the pressure will increase as the sheet of cotton or other fibrous substance proceeds to the lap-roller *l*. Another arrangement of rollers for calendering is shewn at fig. 3, wherein, by placing two rollers *t*, *t*, above the three rollers *u*, *u*, *u*, four points of contact and pressure are obtained by the use of five rollers only. The above arrangement of calendering apparatus is equally applicable to other preparation machinery, wherein calendering apparatus is generally employed.

The second part of the invention is shewn at fig. 4, which represents, in longitudinal section, an apparatus designed for the purpose of arresting and collecting such short fibres of cotton and other fibrous material as escape with the dust from the lap-machine, and are usually blown by the fan into the open air, to the great inconvenience of the neighbourhood. This apparatus, which is intended to be placed in the flue along which the dust, &c. is blown by the fan, consists of a wire-cage or cylinder *a*, enclosed in a case *b*, open at each end. Through this case, the current of air passes, carrying with it the dust, and depositing the short fibres of cotton, &c., upon the surface of the cage *a*, which, as it revolves, slowly laps the waste cotton, &c., upon a roller *c*, covered with cloth for that purpose.

The third part of the invention is shewn at figs. 5, and 6; fig. 5, being a plan view of the apparatus, with the top part or cover of the casing removed; and fig. 6, being a vertical section of the same: in each figure the apparatus is shewn as applied to an ordinary drawing frame. By referring to the specification of the patentees' former patent, above alluded to, it will be seen that the invention consisted in a certain arrangement of mechanism, by which the slivers of cotton or other fibrous substance were deposited in the can in a certain novel and peculiar manner, which would allow of their being subsequently withdrawn readily and without injury; but, by this arrangement, no twist was given to the cotton or other fibrous material, except one turn for each revolution of the can. The object of the present improvement is to impart any determinable amount of twist to the sliver, as it is deposited in the can or other receptacle. A, is the framing of the machine; B, the roller-beam; C, C, the drawing-rollers; and D, D, the calendering-rollers; E, is the main shaft, extending horizontally the whole length of the machine (or any number of machines), and driving the vertical shaft F, by the bevil gearing G. This shaft F, has at its upper end a spur-wheel H, for driving the depositing apparatus. *a*, *a*, is the outside casing of this apparatus, enclosing and supporting the box *b*, and ring *c*, each of which has a spur-wheel formed around its outer circumference; the pitch of the lower spur-wheel *d*, on the ring *c*, being rather coarser than that of the upper wheel *e*, upon the box *b*,—about one tooth less in twenty-six, more or less, according to the variation of speed required. The spur-wheel H, gears into both of these wheels, and turns them in the same direction; but the lower wheel *d*, upon the ring *c*, which carries the can *i*, is driven faster than the wheel *e*, upon the box *b*. This box *b*, carries a stud *f*, upon which the spur-pinion *g*, turns loosely, it being geared into an internal spur-wheel *h*, formed upon the interior circumference of the ring *c*; an opening made in the side of the box *b*, allowing it to protrude for that purpose. As the ring *c*, which carries the internal wheel *h*, revolves slower than the box *b*, which carries the pinion *g*, that pinion will be caused to revolve, carrying with it the pinion *i*, fixed upon its boss. This pinion *i*, gears into another pinion *k*, turning loosely upon the stud *m*; and to the boss of this pinion the spur-wheel *l*, is fixed. The spur-wheel *l*, is geared into and drives the wheel *n*, keyed on a stud *o*, attached at its lower end to a circular plate *p*, which turns in a circular aperture cut in the bottom of the box *b*, (but not concentric with that box). The rim of the plate *p*, rests upon the bottom of the box *b*, on which a horizontal circle of bevilled teeth *q*, is formed, extending around the aperture made for the plate *p*; and there is a small bevil-pinion *r*, fixed to one of the delivering rollers *s*, and gearing into the horizontal circle of bevil teeth *q*. Now supposing the box *b*, and the plate *c*, to be revolving in the same direction, but at different relative speeds, then the stud *o*, which carries the plate *p*, and delivering apparatus, will be carried with the box *b*, around the centre of the said box, at the same time that the spur gearing above mentioned will cause the plate *p*, to revolve round its own axis; and the bevil-wheel *r*, being actuated by travelling in the circular rack *q*, will cause the delivering rollers *s*, to revolve. As the can I, which is attached to the ring *c*, is revolving in the same direction as the box *b*, (but at a quicker velocity), the sliver of cotton or other fibrous materials, passing through the guide or trumpet *t*, will be deposited in excentric helices in the can I, at the same time that a certain amount of twist is imparted thereto, which twist may be varied by altering the relative diameters of the smaller spur gearing.

The fifth part of the invention is shewn at figs. 7, 8, and 9; fig. 7, represents a side elevation of the upper part of a flyer of the ordinary roving-frame, in which the legs or arms of the flyer (being jointed above the top or elbow) are caused to act upon the bobbin like tongs, and thus dispense with the small spur or lever at the bottom of the flyer, called the presser. *a*, is the boss or upper part of the flyer, through which the sliver or roving of cotton *b*, passes to the hollow arm *c*. The top part *a*, and arms *c*, are jointed together, and swivel upon a central pin or stud. At this joint a coiled spring *d*, (exactly similar to the ordinary snuffers' spring) is inserted, one end of which is to be fast to the head, and the other end to the arm of the flyer; whereby the desired elasticity is imparted to the arms, to effect the pressure on the bobbin. It must be observed, that the lower end of the arm should be made smaller, to lap one or two folds of the roving around it, to create the drag usually obtained by the folds around the common presser-lever. Fig. 8, represents a sectional plan view of a common presser-flyer, wherein the ordinary mode of giving elasticity to the presser is employed; that is, by means of a long tail-spring being attached to the arm of the flyer. The improvement in this apparatus is, the application of the loop or guard *a*, it being attached near the bottom of the arm *b*, of the flyer, to surround the tail-spring *c*, and thus prevent its being broken off or forced outwards. This guard or hook is formed with an inclined plane on the inner side, for the end of the tail-spring to act against, which, as the presser expands by the increasing diameter of the bobbin, will alter the fulcrum of its leverage, and thus regulate the pressure upon the bobbin, by overcoming the centrifugal force of the presser during its revolution, and thereby cause an equal or proper tenacity upon the bobbin. Fig. 9, is a sectional plan view of a flyer, shewing the method of increasing the pressure of the spring when a convolute spring is employed. *a*, is the hollow arm of the flyer, provided near its lower end with a bracket *b*, in which two studs or spindles *c*, and *d*, are mounted. These studs have small spur segments *e*, and *f*, at one end, which gear into each other; *g*, is a convolute spring, one end of which is made fast to the stud *c*; and after making a few turns around the stud *c*, the other end is attached to the stud *d*. Thus, as the presser *h*, which is fast to the stud *c*, expands, both ends of the spring *g*, are tightened or wound up at the same time, and the pressure is thereby increased. Should such pressure be required to be equalised instead of increased, the attachment of the end of the spring next to the flyer-arm must be on the reverse side of the stud.

The patentees remark, that they do not intend to confine themselves to the inclined plane acting upon the tail of the common spring, for the purposes above explained, nor the action upon the convolute spring; but, under this part of the invention, they claim any contrivance or application, whereby the elastic force of the presser is increased as the bobbin increases in diameter; whereby the centrifugal force of the presser is overcome as it revolves, and an equal contact is preserved with the bobbin at all parts of its formation.—[*Inrolled in the Petty Bag Office, December,* 1846.]

To Alfred Vincent Newton, *of the Office for Patents,* 66, *Chancery-lane, in the county of Middlesex, mechanical draftsman, for an invention of improvements in combing wool,—being a communication.*—[Sealed 22nd December, 1845.]

This invention of improvements in combing wool, as communicated to the patentee, consists in the employment of certain novel arrangements of machinery, whereby the necessity of heating the combs is done away with, and the working of the teeth of the combs between each other (which causes much waste) is entirely avoided. Another advantage, consequent on the use of this invention (which is called after the inventor, "Seydoux's system)" is, that wool combed by this improved machinery will not require to be again cleansed before being submitted to the operation of spinning. The wool, before it is brought under the action of the improved machinery, is first cleansed and washed in the same manner as for combing by hand; and, when so prepared, is, while still in a moist state, submitted to a machine somewhat similar in construction to a carding-engine. This machine is exhibited in sectional elevation at fig. 1, in Plate V., and is intended to lay the fibres of the wool at their full length, and form a sheet of wool, capable of being taken up by the teeth of combs (hereafter to be described) in detached portions without breaking the fibres.

The wool is stretched as much as possible in the direction of its length upon an endless cloth A, which carries it to a pair of fluted wooden rollers B; from thence the wool passes between two similar rollers C, of a rather larger diameter, in order to obtain a slight degree of tension. On leaving the second pair of rollers, the wool is taken up in small portions at a time by a drum or cylinder D, furnished with a fillet of coarse wire cards;—the dimensions of this drum may be varied according to circumstances. As the wool is taken up by the drum, it is forced down between the teeth of the cards by means of a circular rotary brush E; and this feeding of the drum with wool is continued until the teeth of the cards are fully charged therewith. Any portions of the wool which are not forced into the cards are taken up by the clearers F, furnished with a set of fine combs, about half an inch long, set in a contrary direction to the teeth of the cards. When the drum is charged with a sufficient quantity of wool (and this quantity must be regularly ascertained by weighing), the machine is to be stopped; and the sheet of wool thus produced is divided across at a portion of the periphery of the drum, where a space is left without teeth to the extent of about one-third of an inch for that purpose. The lower end of the sheet of wool is then introduced between a pair of grooved iron-rollers G, about two inches in diameter, which, on being put in motion by means of a winch-handle, with which one of them is furnished, will strip the wool completely off the drum. The wool is then submitted to a second machine, precisely similar to the one above described; care being taken that that end of the sheet which came last off the drum shall be first fed to the rollers B. After being taken from the second machine, the wool is cleansed in the ordinary manner, and twice again submitted to the carding operation, with this difference, that the cards are finer according to the fineness of the wool; care being taken not to have the wool either too dry or too damp. The clearers must be cleared every time the wool is stripped off.

The wool, thus prepared, is ready to be delivered on to the combs, which operation is effected by means of the machine represented at figs. 2, and 3;—fig. 2, being a side elevation, and fig. 3, a front view of the same. A, A, is the main framing, for supporting the various parts of the machine; B, is a horizontal shaft, turning in bearings upon the framing. Upon this shaft two wheels C, C, are keyed, for the purpose of carrying a series of combs, which are to be filled with wool, and then removed to another machine. On one end of the shaft B, the fast and loose pulleys E, are keyed; and the other end is provided with a small pinion F, which gears into the wheels G, and H, mounted on brackets attached to the framing. These wheels G, and H, gear respectively into the wheels I, and K, on the right and left hand end of the machine. The wheel I, is keyed on to the axle of a fluted roller L, which is the upper one of a pair of rollers for conducting the wool from a table M, to the combs D; and the wheel K, is keyed upon the axle of a fluted roller N, which is the lower one of a pair of rollers for conducting the wool to the combs on the other side of the machine. The rollers L, and N, are made of iron, and are 1¾ inches in diameter. The other rollers L*, and N*, which act as pressing rollers, are made of wood covered with leather, and are 2¾ inches in diameter. This difference in the diameters of the two rollers is necessary, in order that the combs in striking the wool too near the point of contact of the rollers, may not break it; and as on one side of the machine the combs are charged in rising, and on the other in descending, the wooden roller must be placed in one case above the fluted roller, and in the other below it. The relative speed of the rollers and the combs varies according to the quality of the wool. If it is short and hard to comb, they are driven slowly. The distance of the rollers from the combs varies also according to the length of the wool. O, O, are a series of peculiarly formed clamps, bolted on the face of the wheels C, C, and intended to receive the combs D, which may vary in number according to the diameter of the wheels C, C.

The construction of the clamp O, will be clearly seen by reference to fig. 4, which represents it in cross section: *a*, *a*, is a grooved bar, of a sufficient length to reach across the machine from one wheel C, to the other. One side of this bar is provided with vertical slots *b*, which respectively receive a circular projecting portion *c*, of a support *d*. In the lower end of these supports, which are somewhat longer than the depth of the grooved bar *a*, a vertical slot *e*, is made, to allow a screw-bolt *f*, to pass through and secure the support *d*, to the bar *a*, while it at the same time admits of the support being adjusted to any desired height. Through the upper part of the support *d*, at a line with the centre of the projecting piece *c*, a bolt *g*, passes; this bolt is provided on its inner end with a thread, which is screwed into a bar *h*, of the same length as the bar *a*, and made of such a breadth as to fit a recess formed in the back of the combs. It will now be seen, that as the bar *h*, is free to move forward, it will, if pressed into the recess in the back of a comb, hold it fast in the groove of the bar *a*. This object is effected by a screw P, (figs. 2, and 3,) which passes through one side of the bar *a*, at about the middle of its length; and when the comb is required to be released, it will be only necessary to reverse the screw, and draw the comb laterally out of the machine. If the comb is not at a proper height in the machine for working, it may be regulated by raising or lowering the supports *d*; which movement is easily effected by reason of the slots *b*, and *e*, before mentioned. The bar *h*, besides regulating the height of the combs, effectually prevents them from being shifted from their grooves during the operation of combing.

The construction of comb which the inventor employs, and which he considers to be of essential importance in the proper working of the machine, is thus described:—The teeth of the combs (which are preferred to be made of cast steel), whether arranged in two or more rows, must be of such a length, that when placed in the machine their points shall all describe a circle of the same diameter; and for this purpose (contrary to the usual method), the shortest form the outside row, and the longest the inside row. The first or outside row should be about 3½ inches, the second 2⅔ inches, and so on in proportion. One edge of the back of the combs is provided with teeth along its whole length, for a purpose to be afterwards mentioned with reference to the machine in which the finishing of the combing is completed. The backs of the combs are about two feet in length, and are made of copper in preference to any other material.

Instead of the peculiar construction of comb above described, the inventor sometimes employs combs having two rows of teeth, the points of which will coincide and form a single row of points. In forming this kind of comb, the lower row (which in this case consists of short teeth) is placed at right angles to the back, and the teeth of the upper row are placed at an incline, so that the points of all the teeth are in a line, and enter the wool simultaneously, as it is supplied to the machine by the rollers. Combs also of the common construction may be used, but not with the same advantage.

The clamps O, O, having been furnished with combs, and a given quantity of wool having been supplied to the feed-rollers, rotary motion is communicated to the wheels C, C, when the points of the teeth take up the wool, as it is delivered into the machine by the two pairs of feed-rollers, situated one at each end of the framing. On the axle of the fluted roller N, a worm *i*, is keyed, which takes into a worm-wheel (not shewn in the figures), mounted on a stud bracketed to the framing. The rotation of this wheel will, at a certain given period, release a spring-hammer, and allow it to strike a bell on the framing. If the release of the hammer is timed for the bell to sound when the rollers have performed such a number of revolutions as will pass all the wool into the machine, the workman will then be informed that the combs are fully charged, and ready to be taken out and placed in the machine next to be described. It will now be necessary to shift the driving-strap on to the loose pulley; and in order to stop the further revolution of the combs, a break is provided, which is made to press upon a third pulley on the main driving-shaft, by the workman placing his foot on the step n^*. The break consists of two horizontal levers n^1, n^2, jointed together, and vibrating on fixed centres in the framing. On the outer end of the lever n^2, a vertical rod n^3, which slides in a guide is jointed; n^4, is a curved piece, which passes over the top of a fixed pulley on the driving-shaft, and is attached at one end to the top of the vertical rod n^3, and at the other end jointed to a stud on the framing; n^5, is a coiled spring, to keep the curved piece n^4, free of the pulley when the machine is in action.

The combs being now full, they are released from the grasp of the clamps O, by turning the screws P, when the combs are free to be withdrawn. The wool in the combs is laid smooth by a hand-comb, and is then ready to be taken to the machine next to be described.

Fig. 5, represents, in side elevation, the machine to the action of which the wool is now to be further subjected, before it is perfectly combed and fit for spinning; fig. 6, is a plan view of the same; and fig. 7, is a section taken in the line 1, 2, of fig. 6. A, A, is the main framing, which, by means of brackets and standards attached thereto, supports the various parts of the machine; B, B, are standards, placed at about the middle of the framing, for supporting the various rollers through which the wool is intended to pass, when taken off the combs; C, is the main driving-shaft, supported on one side of the machine by an adjustable bracket *a*, attached to one of the standards B, and on the other side of the machine rests in a slotted bracket *b*, attached to the other standard B. On this shaft is a small pinion D, which takes into a wheel E, mounted on a short shaft in an adjustable bracket *c*, attached to the main framing. To the same shaft is also keyed a pinion F, which drives a wheel G, mounted on a shaft H. This shaft H, has bearings in adjustable brackets d, d^1, on either side of the machine, and is for the purpose of carrying a pinion I, which takes into a rack formed on the edge of the back of the combs K. By the rotation of this pinion I, the combs (as taken from the former machine) are severally carried forward and pushed out at the other end of the machine. L, is a longitudinal guide, attached to the framing A, and is intended to conduct the combs through the machine. M, is a comb, the back of which is provided with pivots, which rest in brackets attached to the inner sides of the standards B. This comb stands above the teeth of the combs K, and is so placed, that the teeth of the combs K, and M, are at right angles to each other. The use of the comb M, is to prevent any burrs or other extraneous matter, still remaining in the wool, from being taken up with the wool from the teeth of the combs K, as they severally pass through the machine; but to effect this with accuracy, it is necessary that the "dip" of the comb M, should be nicely adjusted,—a mode of doing this will be best seen at figs. 6, and 7. *e*, is a rod projecting from the back of the comb M, and having on its outer end an ear, to receive one end of a pin *f*, which is provided at about the middle of its length with a shoulder, and at its other end a thread is cut to receive a screw-nut. The threaded end of the pin *f*, is passed through a vertical slot in the bracket *d*; and, by screwing the shoulder of the pin tight against the bracket, the comb will be maintained at any desired angle; the pivots on the back of the comb allowing it to rise or fall as required. Upon the main driving-shaft C, is a fluted-roller N, which, as it revolves, gives motion to a similar roller O, turning in bearings in the brackets *p*. This roller is kept in close contact with the roller N, by means of rods *g*, *g*, which are supported by arms P, P, bolted one to each standard B. One end of the rods *g*, is formed into a hook to embrace the ends of the axle of the roller O, and their other ends rest respectively in sockets, forming part of the arms P. *h*, are shoulders attached to the rods *g*, to receive the pressure of a cross-bar *k*, which is provided with a rod *l*, having a thread upon its end to receive a screw-nut. This rod *l*, passes through a spring, the ends of which bear against the outer end of the arms P. When, therefore, the roller O, is required to be brought closer to the roller N, that may readily be effected by turning the screw-nut and increasing the tension of the spring. *m*, is a roller, turning in ears, formed on one end of the diagonal rods *n*, which are themselves supported by brackets *d*, *e*, attached to the arms P, P. Over the roller *m*, and the fluted-roller N, an endless sheet of leather passes; and it is kept at a proper tension by drawing up the roller *m*, as required, which effect is produced by means of the nuts on the screwed end of the rods *n*. *p*, is a small pulley, on the main driving-shaft, for communicating motion through a band or chain to a pulley *q*, which is mounted on a shaft *r*, having its bearings in the standards B, B. This shaft *r*, forms the axles for a roller *s*, which supports a roller *t*, turning in slots in the top of the standards B. Q, is an inclined trough, situated behind the rollers *s*, *t*; and placed in such a position, that its upper end shall be near the rollers, and its lower end projecting over one end of the framing.

The action of the machine is as follows:—Rotary motion having been communicated to the fast pulley on the driving-shaft C, the pinion D, will cause the cog-wheel E, to rotate, and communicate motion through the pinion F, on the same shaft, to the wheel G, on the shaft H, which also carries the pinion I. A comb, charged with wool by the second described machine, is now placed in the guide L, and pushed forward until the rack on the back of the comb is brought into gear with the pinion I. When this is effected, the comb will be passed forward under the stationary comb M, and thence proceed out at the other end of the machine. Combs, charged with wool, are thus successively passed through the machine by the rotation of the pinion I; and, while passing under the comb M, are stripped of the wool with which their teeth was loaded, by means of the grooved rollers N, and O. The use of the comb M, is to separate the knots and burrs or other extraneous matters from the wool, and keep them back from passing between the teeth of that comb up to the rollers N, O, with the wool. At the commencement of the operation, the wool is conducted by hand through a ring or eye, which is placed above the rollers, and supported by an arm attached to the standard B; it is thence conducted to the rollers *s*, *t*, which deliver it out of the machine down the inclined trough Q, in a state ready to be spun. It may be here remarked that the wool is guided upwards to the rollers *s*, *t*, by hand only when the machine is first put in motion; for it will afterwards readily pass up by the continued rotation of the rollers.

The patentee claims, First,—the improvement in combing wool, by the employment of the machine represented at fig. 1, for laying the fibres of the wool at full length, in an even sheet, preparatory to submitting the wool to the action of combing;—the claim, in respect of this part of the invention, being limited to preparing wool, in the manner and for the purpose last mentioned. Secondly,—the improvement in combing wool by the employment of the machinery shewn at figs. 2, and 3, whereby the wool to be combed is taken up on to the teeth of the combs, in order to be submitted to a further process; he also claims, under this head, the improvement in combing wool by the use and application of the peculiar construction of combs, as above described; the points of the teeth of which will all describe a circle of the same diameter; the combs being temporarily attached to the wheels c, and adjusted for their work, as above described. Thirdly,—the improvement in combing wool by the use and application of the machinery above described for taking up the wool from the combs while passing through the machine, and at the same time separating the burrs or other extraneous matters from the wool, and delivering the wool out of the machine in a state ready to be spun.—[*Inrolled in the Petty Bag Office, June, 1846.*]

Specification drawn by Messrs. Newton and Son

To Alexander Mc Dougall, *of Longsight, in the county of Lancaster, Gent., for improvements in the manufacture of glue, and in treating products obtained in the manufacture of glue.*—[Sealed 14th January, 1847.]

The first part of this invention consists in drying glue, by the employment of currents of air artificially dried, either by heat or by means of any of the ordinary drying compounds, such as concentrated sulphuric acid or fused chloride of calcium. The drying chamber, containing the glue, is furnished at one end with a flue, or other means of creating a draft; and the dried air being introduced at the other end is thus caused to traverse the surface of the glue.

The patentee claims, under this head of his invention, the drying of glue by the use of air artificially heated.

The second part of this invention consists in procuring useful products from the refuse of the glue manufacture, termed "scutch," which is composed of lime, fatty acids, hair, and other animal and earthy substances. The scutch is introduced into a vessel containing water, and is agitated therein until the water assumes a milky appearance; and then the water is drawn off. This washing is repeated till the water remains colorless; and then the hair, bone, and sand remaining in the vessel are removed, preparatory to the introduction of a fresh portion of scutch. The different liquors resulting from washing the scutch are allowed to stand until the substances suspended therein have subsided; after which the water is drawn off, and the deposit treated with an acid: the acid preferred is dilute muriatic acid, which is to be added so long as there is any indication of alkaline reaction; but other acids, capable of separating the lime from the fatty matters with which it is combined, may be used. The salt of lime and the fatty matters are then separated in the ordinary manner. The useful products obtained by this process are hair, fatty matters, and salts of lime,—the latter may be used as manure, and for other purposes.

Under this part of his invention, the patentee claims the separation of hair and fatty matters from the other matters contained in scutch.—[*Inrolled in the Inrolment Office, July,* 1847.]

To Charles Reinhold Lothman, *of Craven-street, Strand, in the county of Middlesex, chemist, for improvements in the manufacture of white lead.*—[Sealed 7th January, 1847.]

This invention consists in manufacturing white lead by submitting lead to the action of the acids or vapours produced in the operation of brewing, or in the manner hereafter described.

The process of manufacturing white lead, according to this invention, is carried on in an air-tight chamber, six feet high, six feet long, and six feet broad, having a flue at the lower part of it, connected with a furnace, by means of which the chamber can be heated to from 72° to 96° Fahr. All round the chamber, at distances of about five feet apart, wooden posts are fixed, reaching from the bottom of the chamber to the top; to these posts a number of pieces of wood are fastened, at distances of about one foot apart, for the purpose of supporting other pieces of wood, one inch square, and extending from one end of the chamber to the other; on these last-mentioned pieces 5 cwts. of lead are hung in sheets, two feet long, one foot wide, and one-sixteenth of an inch thick. On the floor of the chamber is placed a tub, containing eight pecks of malt, two pounds of sugar, six pints of yeast, and twelve gallons of water, and the interior of the chamber is heated to the degree above mentioned: this temperature is to be maintained until the lead is converted into white lead. The mixture in the chamber undergoes fermentation; and after the vinous fermentation has ceased, and the liquid becomes mouldy, it is drawn off into vessels, in which it is mixed with two gallons of vinegar, and heated by steam; it is then gradually introduced through a pipe into the chamber. After the mixture is taken out, a fresh supply is to be introduced. The lead is by these means converted into white lead.

The patentee states, that he claims the use of the acids or vapours produced in the process of brewing, or the acids or vapours evolved in breweries, by introducing them into the chamber through a pipe, fastened to the vats or vessels in which they are generated. He also claims the use of atmospheric air, by pumping it into the said chamber by an air-pump. He does not confine himself to the above-named arrangements, but claims the right to use lead in any state whatsoever, capable of being converted into white lead according to this invention; that is to say, lead in any shape in contact with atmospheric air, carbonic, acetic, acetous, and aldehydic acids, and steam; nor does he confine himself to the matters named for obtaining the acids, but employs any that will produce the same effect; neither does he confine himself to the use of acids obtained in the process of brewing by employing the same in a chamber, but claims every way in which those acids can be rendered available for obtaining white lead.—[*Inrolled in the Inrolment Office, July,* 1847.]

To Charles Ford, *of Shelton, in the county of Stafford, engineer, for improvements in the manufacture of pottery or earthenware, and in the tools, instruments, or apparatus employed therein; part or parts of which improvements are applicable to other similar purposes.*—[Sealed 14th December, 1846.]

This invention consists, firstly, in forming or producing various articles of pottery or earthenware by means of dies, moulds, or blocks, made of metal, wood, or other suitable material, in conjunction with a press or stamping apparatus. The articles for which this part of the improvements is most particularly applicable is that class known among potters as "patch-boxes," pomatum or salve-pots, ink-stands, small saucers, door-handles or knobs, and other furniture ornaments. The dies, blocks, or moulds employed in the manufacture of these articles may be adapted to any ordinary kind of press or stamping apparatus; but the machine or apparatus preferred to be used for this purpose is peculiarly constructed, as will be hereafter shewn and described.

The second part of the invention relates to an improved mode of manufacturing certain of the tools or instruments used by potters or earthenware manufacturers; which tools or instruments are known as "cock-spurs," "stilts," and "pins," and are employed for supporting the earthenware articles, one above the other, in the seggars, while being baked or burned. These cock-spurs, stilts, and pins, are usually made by hand, and are, consequently, of an irregular shape. The cock-spurs are pieces of clay, having a triangular base (furnished with three legs or points of equal length) and rising to a point or apex above the base. Now, when it is required to bake or burn a number of plates, or other flat or shallow articles of earthenware, they are placed in the seggar, one above another, and bottom uppermost, and are supported on the points or apices of these cock-spurs; three of which are required for supporting each plate,—the legs of one set of cock-spurs resting on the up-turned bottom of one plate, and supporting, by their upper points, the plate immediately above—and so on, for eight or ten plates, or as many as can be conveniently piled on one another in the seggar. Now, it sometimes happens, if the cock-spurs are not of equal height, or if the legs of one should give way, that a whole pile of ware will fall, and become quite spoiled. In order to remedy this evil, or as far as possible decrease the liability of its occurrence, the cock-spurs, as well as the stilts and pins (which are also used for a similar purpose, but for different articles), are formed in moulds, dies, or blocks, so that they may be all exactly of one size.

The dies, moulds, or blocks employed for making small pots or boxes, commonly called patch-boxes, salve or pomatum-pots, door or drawer-knobs or handles, and other small articles, are divided into sections or segmental pieces, which, when placed together, form the sides of a mould, but are capable of being drawn back simultaneously, for the purpose of allowing the article formed therein to be removed. The parts which form the top and bottom of the mould are, in this case, distinct from the side-pieces, and of course work separately.

In Plate IV., fig. 1, represents a plan view of a mould,—the top plate being removed, in order that the interior arrangement may be more clearly seen; and fig. 2, is a transverse vertical section of the same. Fig. 3, is a perspective view of a patch-box, made in the mould represented in the preceding figures; and fig. 4, is the lid of the same, also made in the same mould. The top and bottom plates and frame of the mould are seen at *a, a, a, a*; and *b, b, b*, are three moveable segmental pieces, which form the sides of the mould. These segmental pieces are each provided, at their backs, with a hub *c, c, c*, which is tapped with a female screw, and receives the inner or screwed end of the spindles *d, d, d*, that pass through the sides of the mould, and carry, at their outer ends, pinions *e, e, e*, in gear with a circular horizontal rack *f, f, f*, surrounding the mould-frame. This rack *f*, is provided with a lever or handle *g*, by means of which the rack *f*, is turned, and communicates motion to the pinions *e, e, e*, and, consequently, to the segmental pieces *b, b, b*, which are worked backwards and forwards to open and close the mould. The block or piece that forms the bottom of the mould is seen at *h*, and is mounted on the upper end of a vertical rod, which is raised up by means of a treadle (in the manner hereafter more particularly set forth), when it is required to discharge the newly-formed article from the mould. The inside and top part of the box or other article is formed by the block or piece *i*, which has minute holes made through it, for the purpose of allowing the air, contained in the mould, to escape. This block or piece *i*, acts as a piston or plunger, and is screwed or otherwise attached to the lower end of a vertical rod, whereby it is inserted into and withdrawn from the mould or die when required. The mode of operating with this mould or die, which must, of course, be furnished with some mechanical contrivance (such as that shewn in some of the other figures hereafter more particularly explained) for the purpose of working the blocks or pieces *h*, and *i*, is as follows:—When the mould is not in use, the block or plunger *i*, will be withdrawn from the mould, and suspended by its vertical rod immediately above it; and when the mould is to be brought into operation, a piece of clay, potters' earth, or other plastic material, of suitable dimensions, is placed by the attendant in the cavity, and the block or plunger *i*, is then caused to descend into the mould and press the clay or plastic material, contained therein, into all the interstices, as seen in the sectional view, fig. 2. The box or article when thus formed, is ready to be discharged from the mould; and, in order to do this, the segmental pieces *b*, *b*, *b*, must be drawn back, so as to leave room for the bottom piece *h*, to rise: this opening of the mould is effected, and the three segmental pieces are drawn back simultaneously, by merely pulling round the handle or lever *g*, which, by means of the circular rack *f*, turns the pinions *e*, *e*, *e*, on their axes, and causes the inner or screwed ends of the spindles *d*, *d*, *d*, to enter further into the bosses of the segmental pieces *b*, *b*, *b*, and thereby draw them back the required distance. The bottom piece *h*, is then raised, by means of a treadle, and the box being removed, the bottom piece *h*, is allowed to descend again, ready to receive a second charge of clay or plastic material for a repetition of the operation. The lid of the box (which is seen at fig. 4,) is made in precisely the same manner,—the only difference in the mould being, that the plunger *i*, is made longer, and of a shape corresponding to the inner or under side of the lid.

It will be evident to any manufacturer that, by means of moulds, dies, or blocks, constructed and worked in the manner above explained, an infinite variety of small articles in pottery and earthenware may be produced; such, for instance, as door or drawer-knobs or handles,—a mould, die, or block, to form which, is represented, in section, at fig. 5. In this instance the mould or die is formed of only two parts; the lower half *j*, of the die being fixed in any convenient manner to the block or anvil of the stamping or pressing apparatus; and the upper half *k*, being attached, by screwing or otherwise, to a vertical rod or spindle, whereby it is moved up and down to give the requisite pressure. In order to form a door-knob or handle, a lump of clay, of the proper size, is placed in the lower or fixed half *j*, of the die; the upper half is then brought down on to it, as shewn in the figure, by means of any suitable mechanical contrivance; and when the two parts of the die or mould are brought together, the clay or plastic material will be forced into all parts thereof, and be made to acquire its internal configuration. As it is necessary, however, to have a hole made in the knob, to receive the spindle whereby it is attached to the door or drawer,—this hole is made by means of a small plunger *l*, which slides in a socket or bearing *m*. These knobs or handles sometimes are made with a screwed end, whereby they are secured in any place where they may be required; and as, in these cases, no double force spindle is requisite, the pin or plunger *l*, is dispensed with, and the halves of the mould or die have a screw tapped therein, to form the screwed end of the knob; so that the knob or handle, with its screwed end, is formed at one operation, and may be removed by hand from the lower half *k*, of the mould or die, immediately the upper half, *j*, is raised.

Fig. 6, is a sectional plan view, and fig. 7, a transverse vertical section of a die or mould-box for forming stilts, such as those shewn in plan and elevation at fig. 8. It is constructed upon the same principle as that represented in figs.

1, and 2. The patentee remarks, that he is aware of stilts, somewhat of the form of those shewn at fig. 8, having been made in dies or moulds, but one leg only was formed at a time; and therefore four operations were necessary to produce one stilt; viz., one for cutting out a piece of clay or plastic material of the proper shape and size, and one for each leg; whereas, by the present plan, a piece of clay, of the required shape, may be cut from a large piece or length, and pressed, by means of the improved die, into the proper form at one operation, thereby effecting a great saving in time, and producing a better article. *b*, *b*, *b*, are the moveable parts or blocks which form the die or mould. When the mould is about to be used, the moveable dies *b*, *b*, *b*, are drawn back, and a long triangular-shaped lump of clay or other plastic material *o*, is suspended above the mould; and as the latter requires feeding, the clay is lowered down, either by hand or by mechanical means, so as to allow the dies, in the act of closing, to cut off a disc or flat piece of suitable thickness, and press the same into the mould; and when, by this operation, the stilt has been formed in the mould, it is removed therefrom by simply drawing back the dies by means of the handle or lever *g*; the newly-formed stilt will then drop out of the mould through an opening *n*, on to an endless travelling-band *p*, placed there for that purpose. This band *p*, and also the lump of clay *o*, may be connected, by any suitable mechanical contrivances, to the circular rack *f*, or handle *g*, so as to make them act in unison, if thought desirable.

Figs. 9, represent, in elevation and end view, a pin, which is used for suspending some kinds of earthenware or china articles in the seggars. This pin may be made in a mould, constructed of two parts, one fixed, and the other moveable, like that shewn at fig. 5. Figs. 10, and figs. 11, represent plan views and elevations of two forms of cock-spurs, made according to the improved method; figs. 12, and 13, represent vertical sections of the top and bottom die, employed to make one of the same; and fig. 14, is a plan view of the bottom die. It will be seen, by referring to the sectional figures, that very minute holes are made in the top and bottom dies, to communicate from the top or bottom of the points to lateral or other openings *q*, so as to allow any air that may be in the die to escape, and not injure the fineness of the points, when the pressure is employed to form the cock-spur; and a cylindrical hole *r*, is made in the lower die, to allow a vertical pin or spindle to pass through, for the purpose hereafter explained. Instead of forming the legs of the cock-spurs in conical holes in the lower die *j*, as shewn in the figures, they may be formed by means of conical notches, cut in the sides of the die, into which notches the clay is pressed by the finger of the workman, to produce fine points.

Fig. 15, represents in vertical section, and fig. 16, in horizontal section, a pressing or stamping apparatus, suitable for working the different kinds of moulds or dies above shewn. The particular kind of die which is represented in the drawing, as applied to the stamping apparatus, is that employed for making cock-spurs. The machine consists of a framing *s*, *s*, *s*, made of metal or wood, and upon it a stationary block or anvil *t*, is fixed by means of screws or clamps. The lower or stationary die, shewn detached, and on an enlarged scale, at fig. 18, is secured in any convenient manner to this block; and the upper die, shewn at fig. 12, is secured in a similar manner to the lower end of a vertical rod *u*, which moves in the guide-piece *v*, and is provided at its upper end with a toothed rack, as shewn in the drawing. A sector-rack *w*, at the shorter end of the lever *x*, gears into, and moves the rack of the rod *u*, up and down in its guides. The lever *x*, turns in bearings at the top of the framing, and is jointed at its outer end to a vertical connecting-rod *y*, the lower end of which is jointed to a lever *z*. This lever *z*, turns on a pin or stud 1, affixed to the lower part of the framing; and is provided at one end with a weight 3, and at its opposite extremity with a handle, whereby it is worked.

It will now be understood, that if a piece of clay or other plastic material is placed on the lower die, and the handle of the lever *z*, is depressed by the attendant, the upper die, with its vertical rod *u*, will, by the intervention of the connecting-rod *y*, and the sector rack of the lever *x*, be brought down on to the clay, and force the same into the cavities of both dies, and form the cock-spur. Immediately the attendant releases the handle of the lever *z*, all the moving parts of the press will, by means of the weight 3, be brought back again into their original position. The newly-made cock-spur is removed from the cavities of the lower die by raising the pin 4, which passes through the same, as shewn in the sectional view, and is worked by a treadle 5, below; or, if preferred, this pin may be forced up by means of a spring below, which will raise the cock-spur from the lower die, immediately the pressure of the upper die is removed.

It will be evident, from the foregoing description, that either of the moulds or dies above shewn, except that represented at figs. 6, and 7, may be applied to the stamping apparatus just described. It may be remarked, that when the mould shewn at figs. 1, and 2, is employed, the moveable bottom *h*, of the mould is fixed on the upper end of the pin 4, (which passes through the stationary block, as shewn, and is worked by the treadle); the fixed die being of course removed and replaced by the moveable bottom *h*; and the upper die replaced by the piece *i*, of figs. 1, and 2.

The patentee claims, First,—forming pottery or earthenware pots, boxes, saucers, knobs, handles, and other similar small articles, in dies, moulds, or blocks, in conjunction with an apparatus for pressing or stamping, whether such pressing or stamping apparatus be such as that above described, or any other that will effect the intended purpose. Secondly,—the construction and mode of working the various dies, moulds, or blocks, herein shewn and described. Thirdly,—the mode above shewn of making stilts and pins. Fourthly,—making cock-spurs in moulds, dies, or blocks, whereby these articles may be produced of one uniform and regular size and form. Fifthly,—the arrangement and construction of the pressing or stamping machine or apparatus; and the application of such machine, or any modification thereof, to pressing, forming, or fashioning articles in pottery or earthenware, or other materials.—[*Inrolled in the Petty Bag Office, June*, 1847.]

Specification drawn by Messrs. Newton and Son.

To Alexander Doull, *of Euston-grove, in the county of Middlesex, civil engineer, for certain improvements in railway, steam-boat, and other signals.*—[Sealed 8th February, 1847.]

This invention consists in the employment of compressed air apparatus for producing audible railway, steam-boat, and other signals, in a similar or somewhat similar manner to the ordinary steam-whistles of locomotive engines; likewise in varying the sound, and producing several distinct sounds, by rapidly opening and closing the communication between the whistle and the vessel containing the compressed air; and also in combining two or more whistles of dissimilar sounds, so as to produce an extended scale of distinct signals.

The receiver or vessel for containing the compressed air, may be of any convenient size and shape, and made of any suitable material. The pumps for forcing the air into the receiver may be worked by manual labour, or other convenient means. When the apparatus is applied to a railway train, the pumps may be worked by connecting them with any moving part of the carriages; and in a steam-boat the air-pumps may be worked by the steam-engine; in all cases the connecting apparatus must be of such construction, that it can be readily disengaged, and recourse had to manual labour, if it should be requisite during the stoppage of a railway train or steam-boat; and the receiver should be furnished with a safety-valve.

In Plate V., fig. 1, is an elevation; and fig. 2, a plan view of an apparatus for giving signals by means of compressed air. *a*, is the receiver, into which the air is forced through the pipe *b*, by a single-acting pump *c*; the piston-rod of the pump is connected to a crank *d*, on the end of the horizontal shaft *e*, which works in bearings on the top of the receiver; and this shaft is caused to rotate by turning the handle *f*. *g*, *g*, are guide-rods, passing through the stays *h*, *h*, attached to the cylinder of the air-pump. *i*, is the whistle, which is similar to the ordinary steam-whistle; but the shape may be varied, so as to produce distinct and dissimilar sounds.

j, is a cog-wheel, the axis of which turns in a bearing at the top of the framing *k*; and it is caused to rotate by means of the handle *l*; this wheel gears into a pinion *m*, on the axis of a cock or valve, by which air is admitted, through a small pipe, from the receiver *a*, to the whistle; so that when the wheel *l*, is caused to revolve rapidly, a thrilling sound will be produced; and it may be so varied and combined with other sounds as to form a gamut of considerable range, which may be still further extended by a combination of two whistles of dissimilar sound, connected by wheelwork or otherwise, as hereafter explained.

Fig. 3, is an elevation of an apparatus, furnished with two air-pumps and two whistles. *a*, is the receiver; *c*, *c*, are two air-pumps, partly let into the receiver; and *d*, *d*, are the piston-rods, connected to the crank-shaft *e*, which can be turned by manual labour, applied to the handle *f*, or by means of an endless band from any moving machinery passing round the pulley *g*. *i*, *i*, are two whistles; *j*, is a cog-wheel, similar to that before mentioned, but gearing into two pinions on the axes of the cocks or valves, used for admitting the compressed air to the whistles from the receiver; and these pinions are so constructed, that they can be slidden along their axes, for the purpose of throwing them out of gear with the wheel *j*. By the rotation of the wheel *j*, when the two pinions are in connection therewith, both whistles are caused to produce a thrilling sound; but the pinions may be alternately thrown out of gear; and the whistle belonging to the disconnected pinion may be made to sound steadily, or not to sound at all; while the whistle belonging to the other pinion will produce a thrilling sound; and in the same manner a great many other peculiar combinations of sound may be produced.

The patentee claims, Firstly,—the employment of compressed atmospheric air for the production of audible railway, steam-boat, and other signals, as above described. Secondly, —the mode of varying the sound, and of producing several distinct sounds, by rapidly opening and shutting off the connection between the compressed air receiver and the whistle. Thirdly,—the mode or modes of combining two or more whistles of dissimilar sounds, so as to produce an extended scale or gamut of distinct signals. Fourthly,—the application of wheelwork, as above described, to steam-whistles of the ordinary construction, for the purpose of varying the sounds obtained therefrom. — [*Inrolled in the Inrolment Office, August*, 1847.]

To **Egbert Hedge**, *formerly of No. 7, Howard-street, in the parish of St. Clement's Danes, and county of Middlesex; now residing at the Commercial Hotel, Blackfriars-road, in the county of Surrey, Gent., for certain improvements in rails for railways, and in the manner of securing them.*—[Sealed 12th February, 1847.]

This invention consists in a new form of rail, and in the method of applying and securing the same to longitudinal sleepers.

In Plate V., figs. 1, and 2, are transverse sections of the improved rail; fig. 3, is a transverse section of the longitudinal sleeper, with the rail applied thereto; fig. 4, is a plan view; and fig. 5, a side elevation of the same. The rail is formed with an upper and under "table" *a*, and *b*, connected by an intermediate piece or rib; the upper table *a*, of the rail rests on the top of the longitudinal sleeper, which consists of two pieces of wood *c*, *c*, of suitable scantling and length, having grooves formed therein to receive the edges of the lower table *b*; the pieces *c*, *c*, are secured together by pins *d*, and wooden filling-pieces *e*, are inserted between them at the joints. The upper table *a*, is made of greater breadth at the extremities of each length of rail than at the other parts, as represented at a^1, figs. 4, and 5, (the difference in the breadth of the shoulders at the extremities and intermediate parts is also shewn by the transverse sections, figs. 1, and 2); and, to prevent the ends of the rails from rising above each other, a semi-cylindrical groove is formed in each, so that when the adjacent ends of two rails are placed in contact, the grooves therein will produce a cylindrical opening for the reception of the pin *f*, which also extends through two cylindrical openings in the sides of the sleeper.

The patentee says, that rails of the form and secured as above described may be made of cast-iron; as, from the continuous support which the rail will receive, both vertically and laterally, by reason of the peculiar method of clamping it to or securing it in the longitudinal sleeper, fractures will not be likely to occur; and in case of any fracture taking place, the road will not be deranged by the displacement of the fragments. At those parts of the line where a change from one set of rails to another may be desirable, wrought-iron rails, of the ordinary shape, and laid in the manner usually practised for that purpose, are to be employed.

The patentee claims, as his invention, Firstly,—a rail with an upper and under table and shoulders, as above described. Secondly,—the securing a rail by clamping the same in longitudinal sleepers, as above described. Thirdly,—the combining rails with longitudinal sleepers, formed and firmly secured together, as above described.—[*Inrolled in the Inrolment Office, August*, 1847.]

To John Loach, *of Birmingham, in the county of Warwick, brass founder, for a certain improved fastening or certain improved fastenings for windows, shutters, doors, and tables; applicable also as a fastening or fastenings generally.*—[Sealed 8th February, 1847.]

This invention consists in certain arrangements of apparatus, to be used as fastenings for windows, shutters, doors, tables, &c.

In Plate VI., fig. 1, is a plan view of an improved fastening for window sashes: *a*, *b*, are portions of two sashes, having two metal plates *c*, *d*, screwed thereto. On the plate *b*, is fixed a stud *e*, carrying a lever *f*; the end f^1, of which is formed into a thumb-piece; and the other end f^2, is curved: the curvature of the concave side of the end f^2, is excentric to the axis *e*; and the upper surface of this end is inclined. *g*, is a steel spring, secured to the plate *a*, and pressing against the lever *f*. *h*, is a roller, mounted on a stud projecting from the plate *b*; it works beneath the box *i*, the under surface of which is inclined. The lever *f*, is represented in the position it would assume when holding the sashes securely together; and it is retained in this position by the spring *g*. To unfasten the window sashes, the end f^1, of the lever must be moved in the direction of the arrow, so as to withdraw the curved end f^2, from beneath the plate *b*; and the window can then be opened. To secure the window sashes again, the window must be closed, and the end f^1, of the lever moved in the opposite direction to that last mentioned. If, in closing the window, the upper sash has not been raised to a sufficient height, or the lower sash has not been sufficiently depressed, the inclined upper surface of the end f^2, of the lever, acting against the inclined under surface of the plate *b*, will raise the upper sash, or depress the lower one, to the extent required, in order to bring the upper surfaces of the sash-bars *a*, *b*, to the same level. The sashes are drawn close together by the excentricity of the concave side of the end f^2, of the lever; for, as the end f^1, is moved in the direction of the dotted arrow, those parts of the curved end f^2, which pass in succession over the roller *h*, being of a gradually decreasing radius, will draw the roller closer to the axis of the lever *f*; and, consequently, the sashes will be brought close together. By the action last described, the sashes are also pressed laterally against the sides of the window frame; and are thus prevented from shaking when acted on by the wind.

Fig. 2, exhibits a modification of the improved fastening. In this instance, a lever *j*, is substituted for the spring *g*; which lever is caused to press against the lever *f*, by a coiled spring in the box *k*; and the lever *j*, carries at its end a small roller, which, by working in contact with the lever *f*, reduces the friction.

When the improved fastening is to be applied to tables, the patentee sometimes modifies it in the manner shewn at fig. 3. Instead of the spring *g*, or lever *j*, a click *l*, is used, which is caused, by its spring *m*, to catch into the teeth formed on the lever *f*, and hold it firmly in the position in which it is placed: the lever *f*, is released, by pressing the end l^1, of the click in the direction of the arrow.

The above fastenings may be applied to doors or shutters, or used as fastenings generally.

The patentee claims the construction of a sash-fastener, in which, by the means above described (that is to say, the motion of a lever), three separate motions are communicated to the sashes to which the fastening is attached; by which said motions, the sashes are, firstly, raised or lowered to the proper height; secondly, drawn closely together; and thirdly, pressed against the window frame, so as to prevent the shaking of the sashes, as above described and illustrated by fig. 1;—also the modifications of the same, represented at figs. 2, and 3; and the application of the said fastenings to doors and shutters, and as fastenings generally.—[*Inrolled in the Inrolment Office, August,* 1847.]

To Antoine Perpigna, *of Paris, in the kingdom of France, advocate, for an invention of improvements in regulators for qualifying the actions of mechanical powers,—being a communication.*—[Sealed 29th June, 1846.]

The nature of this invention of improvements in regulators for qualifying the actions of mechanical powers, may be thus briefly described:—Suppose that an engine, the speed of which is required to be regulated, turns a wheel A, which, on being pressed against another wheel B, communicates its movement to it—and that the number of revolutions of the wheel B, within a given time, is regulated by a pendulum—also that another wheel C, receiving motion direct from the engine, is driven at such a speed, that when the engine is working at its usual rate, it will make exactly the same number of revolutions as the wheel B, in the same space of time.—These two rotating parts are put in communication by a differential movement (obtained either by means of gearing or by a screw); and when a variation is perceptible between the speed of the wheels B, and C, this difference of speed is, by this invention, converted into a rotary or rectilinear motion (according to the construction of the machine), for the purpose of acting on the entrance or exit aperture of the motive agent, and diminishing or increasing the speed of the engine. The action of the regulator will thus be always in proportion to the speed of the wheels B, and C. As the differential movements, which the inventor employs for governing the supply of steam or other motive power to the engine, may be obtained either by means of a screw or by gearing, it is evident that the apparatus will admit of various modifications.

In Plate VI., arrangements of machinery are shewn for carrying this invention into effect. The improved arrangement of governor, which will be first described, is provided with gearing for applying the differential movements above mentioned. Fig. 1, is a front elevation of the governor; fig. 2, is a plan view of the same; fig. 3, is an end view, as seen from the right hand side of fig. 1; and fig. 4, is a horizontal section, taken in the line 1, 2, of fig. 1. A, A, is the framework, for carrying the bearings B, B, which support the various parts of the apparatus; C, D, and E, are shafts, placed in a line with each other, and forming axles for the gearing; F, is a cog-wheel, keyed to the shaft C, and provided with a smooth side face, to act upon a friction-plate G, cast upon one end of a hollow axle, the other end of which is furnished with a bevil cog-wheel H. Into this hollow axle the end of the shaft C, enters, to support it in a proper central position; but it is further supported by the bearing B^3, and revolves freely on the shaft D. I, is a bevil cog-wheel, corresponding to H, and also turning freely on the shaft D; the boss of this wheel is continued, so as to form a hollow axle, and carry at its other end a cog-wheel K. Between the bevil-wheels H, and I, is a boss or collar *a*, keyed fast to the shaft D, and revolving therewith. This boss is provided with a stud or pin *b*, (see fig. 4,) upon which a bevil-pinion *c*, turns freely, and gears into the wheels H, and I. The shaft E, turning freely in its bearing B^4, is intended to support a cog-wheel L, on the boss of which a friction-plate M, is cast. The right-hand end of the shaft D, enters the boss of the wheel L, and carries a friction-plate N, which turns with that shaft. Both the friction-plates G, and M, are furnished with washers of leather or other soft substance, in order to increase the friction of contact when the apparatus is in motion.

The several rotating parts of the apparatus are secured in their proper places by means of an arched beam O, which springs from the bearing B^4, and embraces the lower end of the bearing B^1.—*d*, and *e*, are screws, for bringing the friction surfaces into contact with each other. P, (fig. 1,) is a shaft, supported in bearings *f*, *f*, and furnished with a cog-wheel Q, which gears into the wheel F, on the shaft C; it is also provided with a cog-wheel R, (of smaller diameter than Q,) whereby motion is communicated through an intermediate pinion S, to the wheel K, which is thus made to revolve in an opposite direction to the wheel F, in order that their respective bevil-wheels H, and I, may rotate in reverse directions. These wheels Q, and R, are driven by means of a bevil-wheel T, which is keyed on the same shaft P, and takes into a bevil-wheel U, in connection with the engine which the apparatus is intended to govern. Attached to the back of the bevil-wheel H, is a pin *g*, projecting radially therefrom: this pin, which is termed "the impulse-pin," is intended to take into a notch, formed in the rim of a circular plate V, supported by and vibrating on a stud *h*, secured to a curved bar W, provided for that purpose. To the lower part of the plate V, a pendulum X, is firmly attached, as shewn at figs. 1, and 3. The pendulum may be made so as to be adjustable in its length to suit various speeds of beating; or it may be of a certain fixed length, when the engine to be governed is required to work always at the same speed—its vibrations are caused by the action of the impulse-pin *g*, against the sides of the notch in the plate V. Y, is a rack, in gear with the cog-wheel L; and, at its upper part, it carries a rod, which is intended to be brought into connection with the supply and cut-off valve of the engine, in any convenient manner. Whenever, therefore, the rack ascends or descends, the supply of steam or other motive agent to the engine is diminished or increased; and by this means the speed of the engine is controlled.

The following is a more detailed explanation of the action of the machine:—Let it be supposed that the wheel I, makes 60 revolutions per minute, when the engine is working at its usual speed—the pendulum X, is beating seconds—and the wheel F, is making 75 revolutions per minute.—As the wheel F, is brought into contact with the friction-plate G, as before stated, this plate, together with the bevil-wheel K, will have a tendency to revolve at the same speed; but they are prevented from making more than 60 revolutions per minute by the action of the pendulum X, which, vibrating on the centre-pin *h*, at the given speed of 60 beats per minute, brings the notch in the rim of the plate V, in a line with the pin *g*, at every second; and thus, if the pin *g*, comes into the position to pass the notch, when the pendulum is out of the perpendicular, its further rotation will be stopped by the rim of the plate V, against which it will be held until the notch in the rim again presents itself. This check in the rotation of the wheel H, will cause the friction-plate G, to slip on the face of the wheel F; and the same effect will be produced whenever the rotations of the pin *g*, are unequal to the number of vibrations of the pendulum.

It has been assumed, that the speed of the bevil-wheel I, (which receives motion through the wheel K, direct from the engine) is 60 revolutions per minute; if then the rotation of the wheel H, is momentarily stopped, the pinion *c*, in gear with both these wheels, as it rotates, will be made to traverse over the face of the wheel H, in the direction of the arrow; and, in so doing, will cause the shaft D, to move round, until the wheel H, (disengaged, as before explained) continues its rotation. By this movement of the shaft D, the friction-plate N, keyed thereto, will communicate motion to the plate M, in contact therewith, and also to the cog-wheel L, which, gearing into the rack Y, will cause that rack to descend, and draw down the rod in connection with the supply-valve, whereby the admission of steam to the engine will be diminished. If the speed of the engine is so reduced as to be unable to drive the wheel I, at a rate equal to the vibrations of the pendulum, the rotation of the wheel H, will cause the pinion *c*, to traverse the face of the wheel I, in an opposite direction to that of the arrow. The shaft D, will then move round in the opposite direction; and, through the action of the friction-plates N, and M, the wheel L, will raise the rack Y, with the rod in connection with the supply-valve, whereby a greater quantity of steam will be supplied to the engine. When the supply-valve is open, either to its full extent, or is completely closed, the rack, which is provided at top and bottom with studs *i*, *i*, will be stopped in its ascent or descent, as the case may be, by one of the stops *i*, coming in contact with the friction-roller *k*, in the rack-guide Z; and the friction-plate N, will then slip over the face of the plate M.

In order to call the attention of the engineer to the working of the engine, it may be thought desirable to attach a striking apparatus to the governor. In the drawings one mode of effecting this is shewn. To the back of the rack Y, an arm *l*, (see fig. 3,) is affixed, its lower end being bent slightly inwards. This arm is intended to act upon a finger *m*, secured to a horizontal rod *n*, mounted in ears on the back frame; and on this rod is also mounted an arm *o*, and hammer *p*, which, by means of a spring, shewn by dots in fig. 2, have always an inclination to fly upwards. Projecting from the upper part of the arched beam O, is a stud *q*, which carries a bell *r*; and on one side of the cog-wheel K, a pin *s*, is provided. When the rack Y, has arrived at its highest position, the arm *l*, will have left the finger *m*, free;—this will allow the hammer *p*, to fly up and strike the bell *r*; and at every rotation of the wheel K, the pin *s*, on its side will depress the end of the pin *o*, and, drawing the hammer back, will cause it to strike on the bell once for every rotation of that wheel. A similar effect will be produced when the rack is at its lowest position, for the finger *m*, which has been kept back as long as it was in contact with the arm *l*, will then be above the arm, and free from it; the hammer will therefore again fly upwards and strike the bell; such striking being continued by the rotation of the pin *s*, until the arm *l*, is carried up and brought into contact with the finger *m*, as before. At fig. 5, the improved governor is shewn as connected to the throttle-valve of an engine; and it is obvious that it may be as readily applied to sluice-cocks, and other similar purposes.

Fig. 6, represents in front elevation, fig. 7, in side elevation (partly in section, to shew the parts more clearly), and fig. 8, in plan view, an apparatus, in which a screw is employed, instead of gearing, for obtaining the differential movements before mentioned, and applying them to the governing of steam, water, and other engines. *a, a,* is a vertical screw, mounted in sockets *b,* attached to brackets which project from the back plate or frame of the apparatus. Upon the lower end of the shaft of the screw *a,* is fixed a circular plate *d,* furnished with a horizontal finger *e*;—*f,* is a friction-wheel, placed immediately over the plate *d,* and pressed down by springs *g,* upon that plate. The pressure of these springs may be increased or diminished by lowering or raising the inverted cup *h,* (which encloses the springs) by means of the ring *i.* The cup *h,* and wheel *f,* both turn loosely on the shaft of the screw *a.* On the under face of the wheel *f,* a leather washer is provided, in order that it may more readily drive the plate *d,* by friction of contact: the periphery of this wheel is furnished with cogged teeth, as shewn. Above this friction-wheel is a wheel *k,* which turns freely on the shaft of the screw *a,* and is kept in its place on one side by the thread of the screw *a,* and on the other by the stop-ring or collar *l.* In this wheel *k,* are fixed the lower ends of two vertical rods *m,* the upper ends of which are attached together by a cross-piece *n,* provided with a socket, that it may turn freely on the shaft of the screw *a.* These two rods *m,* pass through a rotating disc, carrying at its centre a collar *o,* having a female screw on its inner face; and this disc is embraced at opposite sides by two forks *p,* fixed each on a vertical sliding-rod *q*; which rods are kept in a position parallel to the screw by guides *r,* attached to the sockets *b, b,* at top and bottom of the apparatus: the rods *q,* are united at their upper ends by a cross-piece *s,* which cross-piece is connected to the supply and cut-off valve of the engine to be governed. *t,* is a shaft, mounted in sockets *w, w,* supported by brackets from the back-plate, and receives motion from the engine. Upon this shaft the wheels *u,* and *v,* are mounted; the former being keyed firmly thereto, and the latter, turning loosely on the shaft, communicate motion to the wheels *f,* and *k.* The wheel *u,* which is driven by gearing connected with the engine to be governed, takes into the wheel *f,* whereby rotary motion is communicated to the screw-shaft *a*; the pressure of the springs *g, g,* causing the wheel f, to drive the plate d, (which is keyed on the shaft a,) by friction of contact, as before stated. Beneath the wheel v, is a friction-plate d^1, keyed to the shaft t; and above the wheel an inverted cup h^1, furnished with springs, and a collar i^1, are provided, for the purpose of driving the wheel v, by friction of contact. This wheel takes into the loose cog-wheel k, before mentioned, and causes it to rotate; but, being thus driven by friction only, it is capable of slipping at certain required times. x, is a pendulum, the centre of oscillation of which is in the plane described by the rotation of the centre of the finger e, on the plate d. This pendulum works upon a stud, attached to the back-plate of the apparatus; and, at its centre of motion, it carries a disc y, furnished with a recess z, cut in its periphery for the passage of the rotating finger e, when the pendulum is in a vertical position; but if the finger e, in its rotation, meets with the circumference of the disc y, when the pendulum, in oscillating, moves out of the vertical position, it is immediately stopped, and cannot continue its rotary movement until the recess z, comes opposite to it again. The stoppage prevents the further rotation of the screw-shaft a, and the wheel f, is therefore compelled to slide over the plate until the recess z, coming into a line with the finger e, allows the further rotation of the plate d, and the shaft to which it is keyed.

The construction of this modified arrangement of governor being now understood, in order to clearly comprehend its action, let it be supposed, that the pendulum x, is made to beat seconds, and that the wheel k, makes 60 revolutions per minute, when the engine is working at its usual speed. If the wheel f, also makes 60 revolutions per minute, the finger e, of the plate d, will enter 60 times into the recess z, which is equal to the number of beats of the pendulum; the screw a, will also make 60 revolutions per minute, and the collar o, will remain stationary; but immediately that the wheel k, makes a greater or less number of revolutions than the screw a, the collar o, will ascend or descend, as the case may be; and being connected by the forks p, and rods q, to the supply and cut-off valve of the engine, the speed of the engine will be thereby regulated. The pendulum x, having been constructed so as to beat a given number of vibrations in a minute (as is well understood), the finger e, will, by pressing on the inclined sides of the recess z, communicate the impulse movements thereto, in the same way as before described, with reference to the first arrangement. When the collar o, has, by its superior rotating speed, arrived at the upper end of its course on the rotating screw a, the orifice for the motive agent will be either opened to its full extent or closed, as the case may be; the wheel k, will then be prevented from rotating; and being in gear with the wheel v, as before stated, it will cause that wheel to slip on its shaft t, until the continued rotation of the screw a, has carried down the collar o; the friction of contact of the cup h^1, will then again cause the wheel v, to revolve, and give a rotating motion to the wheel k, as before. This, as well as the before-described governor, may be provided with a striking apparatus, to call the attention of the engine man to the engine. Upon the disc of the collar o, is a pin 1, which, when carried up, is made to strike upon a finger 2, attached to a collar on a vertical rod 3, supported and turning freely in bearings 4. This rod, at its upper end, carries a hammer 5, which, when the pin 1, comes in contact with the finger 2, is caused to strike upon a bell 6, affixed on the top bearing b. A spring 7, which presses on a pin projecting from the collar of the finger 2, returns the hammer to its original position immediately the rotating pin 1, has passed the finger.

It is evident, that in the two modifications above described, the functions of all the parts are identically the same; the only difference being, as has been remarked, in the manner of producing the differential movement.

The patentee claims, First,—the general arrangement of self-acting apparatus, for governing and regulating the speed of engines, as described with reference to figs. 1, 2, 3, and 4, of the drawings; such apparatus being made to act upon the valve of the entrance passage or supply-pipe, for conveying the motive power to the engine, so as to increase or diminish the amount of steam or other motive power supplied thereto, as may be required. Secondly,—the general arrangement of self-acting apparatus, as described with reference to figs. 6, 7, and 8, of the drawings, for controlling the action of steam or other engines. Thirdly,—the application of a vibrating pendulum to governors of steam and other engines, whereby the varying speeds obtained from such engines is made available to regulate their action to the determined pulsations of the pendulum. And, Lastly,—the application of friction surfaces to governors, as above described, whereby the motion communicated to the governing apparatus is controlled in its power, and prevented from breaking or straining the various working parts of such apparatus.—[*Inrolled in the Petty Bag Office, December,* 1846.]

Specification drawn by Messrs. Newton and Son.

To SAMUEL CLIFF, *of West Bromwich, in the county of Stafford, Gent., for certain improvements in the distillation of tar and pitch.*—[Sealed 8th December, 1846.]

THIS invention refers to a mode of conducting the process of distilling tar and pitch, whereby a larger quantity of oil may be obtained, than is generally produced by the ordinary process; and also a new product, which may be termed coke, will result. According to the present mode, the distillation of the tar is continued until somewhere about 35 or 40 per cent. of the tar is distilled over as oil, and the residuum contained in the still forms pitch. The patentee has, however, discovered, that by submitting the tar or the aforesaid pitch, in the process of distillation, to a much higher temperature than that heretofore employed, larger quantities of oil may be obtained; and the residuum in the still will be a very pure coke, which is now much more saleable than the pitch: by stopping the distillation a little sooner, a substance, fit to be used as a fuel instead of coal, is produced.

The improvements, therefore, consist, first, in submitting the tar to a much higher temperature, so that a much larger quantity of oil than ordinary shall result from the distillation, and the residue, when discharged from the still, shall not be pitch, but a substance similar to coke, or fit for fuel; or else, secondly, in re-distilling the pitch, made according to the old process, at a higher temperature, so as to extract all the oil remaining in the pitch, and reduce the residual matter to coke, or a substance applicable as fuel. When the distillation is carried on to the utmost, and at the highest temperature (whereby all the bituminous matters are driven off) coke is produced as the residue; but if the distillation is stopped at a somewhat earlier period, leaving a certain portion of the bituminous matter in the still or retort, with (or rather in) the coke, then a product is obtained which may be most advantageously used as fuel in the place of coal.

For the first part of the process, instead of the usual tar-boilers, the patentee prefers to employ cast-iron cylinders, about 2 feet in diameter, and 7 feet long, having doors at each end, and set horizontally, like gas-retorts, in brickwork; the fire-places and flues being made in the ordinary manner. The tar is put into these cylinders, and the heat got up gradually, whereby the vapour is driven off from the tar, through a pipe in the top of the cylinder to the condensers, where it condenses as oil; and the heat is continued, and gradually increased, until either the fuel or the coke (as above named) is produced, according to the desire of the manufacturer. Upon the distillation being finished, the fire is extinguished; and when the cylinders are sufficiently cool, the door at the end is opened, and the fuel or coke drawn out.

For the second part, viz., the distillation of the pitch (obtained from the tar according to the usual mode), the usual gas-retorts, or ovens may be used as stills; but the inventor prefers using those known as "Clift's brick gas-ovens." The pitch is put into the oven, and the vapour passes through the pipe to the condensers, where it condenses as oil; and the residue is found, on discharging the oven, to be either fuel or coke, according to the length of time the distillation is continued, and the height of the temperature, as described before under the first part. The advantages arising from this invention can also be obtained by mixing up with the tar or pitch, previous to its being put into the cylinders, retorts, or ovens, either small coal, or coke, or peat, or saw-dust, or other carbonaceous ingredients, either separately, or mixed together; and sometimes it may be found desirable to do so. The effect of this introduction of the coal or other matters would be, that the coal, &c. would become coked with the tar and pitch, and the product left in the still would be a coke or fuel, of a mixed nature; but such additions of coal, &c. to the tar or pitch, will not prevent the extra quantity of oil being obtained from the tar or pitch, and used in the same manner as though such things had not been previously mixed with the tar or pitch.

The patentee claims submitting the tar or pitch, either separately or in combination, in the manner above described, to a much higher temperature than that heretofore used, whereby a much larger quantity of oil is obtained than is now produced by the ordinary mode; and the residue, when discharged from the still, is not pitch, but either a substance fit for fuel, or a good coke, according to the will of the manufacturer. The patentee, in conclusion, observes, that although the above invention is chiefly useful for distilling coal or gas-tar, yet, where a larger quantity of tar-oil is desired than can be obtained in the ordinary manner, it is equally applicable and useful for the distillation of the other tars.—[*Inrolled in the Petty Bag Office, June,* 1847.]

Specification drawn by Messrs. Newton and Son.

To George Grundy, *of Manchester, in the county of Lancaster, manager, for certain improvements in furnaces, and in the flues and tiles used in the construction thereof.* —[Sealed 8th February, 1847.]

This invention consists in a novel arrangement of the flues and other parts of a furnace, whereby the heat is more effectually applied; and also in certain tiles to be used in the construction of the furnace.

In Plate VI., a furnace, constructed according to this invention, is shewn, containing four fire-clay or tile cylinders or retorts for generating coal-gas. Fig. 1, is a longitudinal vertical section of the furnace; fig. 2, is a transverse vertical section thereof; fig. 3, is a horizontal section, taken on the line A, B, of fig. 1; fig. 4, is a similar section, on the line C, D; and fig. 5, is a section on the line E, F. *a*, is the brickwork of the furnace. *b*, is the fire-place or chamber, wherein the fuel (which in this case is coal-tar, but other fuel may be used) is introduced; it extends the whole length of the furnace, and is supplied with air through the openings *c*, from two parallel flues *d*, which extend from one end of the furnace to the other, and are furnished with doors at each end to regulate the supply of air. The oven, in which the tile or fire-clay cylinders or retorts *e*, are fixed, is of the ordinary shape; and the course of the flame and heated gases, generated below, is indicated by the arrows in the horizontal sections, figs. 3, 4, 5, which are taken at different levels, in order to shew the continuous traverse of the heated gases from end to end, or from end to centre of the retorts *e*, until they escape through the opening *f*, in the crown of the oven. The cylinders or retorts are made of tile or fire-clay, and may be strengthened, if considered requisite, by imbedding metal hoops in the clay. Each cylinder is open at both ends, and consists of several pieces, which are jointed together, as seen at *g*, fig. 5; the joints being made good with fire-clay, and supported by the fire-clay tiles *h*. The number of joints in each retort will depend upon its length; but this may greatly exceed the length of ordinary retorts, on account of the facility of working at both ends, which the patentee considers an important feature of his invention. The retorts have caps *i*, fitted on each end, furnished with exit-pipes *j*, for the gas. Any accumulation of coal-tar is removed from the retort, by partially opening one end of the retort, and applying an extra pipe to the opposite end; which pipe then acts as a flue, and the draft of air through the heated retort completely removes the carbonaceous deposit.

The patentee states, that the description of the manner of applying his improvements to a furnace for generating gas will enable a person to apply such improvements to furnaces for other purposes.

He claims the general arrangement of the furnace and flues as described, which consists in a continuous fire-place from one end to the other, supplied with air from parallel air-flues,—thus allowing the heat to be conducted from end to end, or from end to centre repeatedly; together with the peculiar form and construction of tile or fire-clay tubes, and the tiles for forming the joints, as above described.—[*Inrolled in the Inrolment Office, August,* 1847.]

To Edward Brown, *late of Adam's-court, in the city of London, now residing at Paris, for certain carbonic compounds, formed of earth, vegetable, animal, and mineral rubbish, fecal substances, the waste of manufactories, and certain acids and alkalies; which compounds are applicable as manures,—being a communication.*—[Sealed 20th February, 1847.]

This invention consists, firstly, in neutralizing the noxious gases emanating from fecal substances, so as to facilitate the collection and preservation of those substances, in order that they may be manufactured into "carbonic compounds," applicable as manures, without injury to health.

The materials used for effecting this object are sulphate of iron, or chloride of sodium, or the chlorides of iron and manganese, or the chlorides, nitrates, and sulphates of copper, lead, tin, and zinc, or pyroligneous acid, or pyrolignite of iron; or the mother waters resulting from the manufacture of any of the before-mentioned substances, or coal-tar, or schistous and bituminous extracts—preference being given to the sulphate and chloride of iron: the material selected must be used in a dilute state. When solutions of sulphate of iron and chloride of iron are employed, they should be poured into the privy or other fecal receptacle, in the proportions of from one to two gallons and a half of the former, and from one to one gallon and a half of the latter, for every forty-eight inches of the cubical contents of the privy. After the mass has been stirred, some of the absorbent powder, hereafter described, should be thrown over it, and the privy closed for ten minutes; at the expiration of which time the mass may be removed, without fear of any unpleasant smell arising, and conveyed in casks to the manure manufactory.

The emptying of the privy may be effected either by an exhausting-pump and hose, or an endless chain of buckets, enclosed in a hood, to conceal the operation. To facilitate the removal of the night-soil, the patentee proposes to get rid of the ordinary stationary privy, and substitute a portable one, consisting of a barrel set on end, having an aperture in the top of the same size as the hose through which the soil is to be discharged. To this aperture a hinged lid is applied, opening inwards, and furnished with a spring, which permits it to open when anything is deposited upon it, but closes it again as soon as the pressure ceases. When the barrel is full, it is to be removed, and an empty one put in its place.

The second part of the invention consists in converting the fecal substances into carbonic compounds, applicable as manures.

The patentee first prepares an absorbent powder, by mixing seventy-five parts of coal or wood-ashes, and earth or road-sweepings, with twenty-five parts of vegetable, animal, and mineral rubbish, such as saw-dust, bone-dust, and the waste matters of tanneries, cotton-mills, &c. He then subjects the mixture, in closed vessels, to a high degree of heat, so that the carbon contained in the organic portions may be blended in a state of minute division with the earthy portions, and thereby impart to the whole a highly absorbent property. Although the patentee prefers the absorbent powder, yet common chimney-soot, or any of the black residual matters of sugar and other refineries, or the black deposits resulting from the combustion of resinous and bituminous substances, may be employed instead thereof.

The fecal matters, which have been treated as before described, are converted into carbonic compounds in the following manner:—For small villages, where the produce would be inconsiderable, the apparatus consists of three inclined pits or basins of an oblong form, situated one above the other, and communicating with each other by self-acting flood-gates. The casks are emptied into the first pit, and from the last pit any given quantity of the fecal matters are taken to a "mixing basin," and mixed with 15 to 20 per cent. of the absorbent powder, or one of the substitutes therefor, so that any adhering damp or any gas which may be now disengaged, will be absorbed by the powder; the mixture is then spread out on platforms of baked earth, or in trays, to dry; and, when dried, it is reduced to powder, and packed in casks. For cities, three inclined basins are also used, but they are made of a circular form, and from each basin a pipe leads to a reservoir, for the purpose of collecting any drainage or liquid fecal matter, in order that ammoniacal salts may be manufactured from the same. The basins are each provided with an agitator, to mix the fecal matters and absorbent powder, and the combined materials drop through traps in the bottom of the basins into passages, from which they are removed in carts to be dried: when dry, the compound is passed through a cylindrical sieve, and then packed in casks.

The third part of this invention consists in manufacturing carbonic compounds, applicable as manures, from the muscular flesh, blood, and offal of animals, and from the waste matters of various manufactures.

The mode of treating flesh is as follows:—After being skinned, it is thrown into a copper, furnished with a perforated false bottom, and filled with water; an addition is then made of from 8 to 10 per cent. of sulphate of iron, chloride of iron, or any of the other salts or materials mentioned in the first part of the invention, or instead thereof from 20 to 25 per cent. of common tan; the materials are boiled till the flesh begins to be disintegrated, when the oil which has been formed is drawn off from beneath the false bottom; the fleshy mass is then taken out of the copper, and the bones are separated from it. The fleshy mass is passed between a pair of grooved cylinders, by which it is reduced to a thick jelly; and this is either dried without any admixture, or after the addition of about 10 per cent. of the absorbent powder, which, without diminishing its strength, tends to retard its decomposition. In some cases, it will be sufficient to boil the flesh in water only, and afterwards immerse it for some time in any of the saline solutions before mentioned, or in cold tan liquor. The flesh, prepared by either of these processes, dries without giving forth any offensive smell; does not engender worms, and may be preserved for an unlimited time. Blood and offal are treated in like manner to produce manures.

Manures may also be obtained from the waste matters of various manufactures, which are rich in fertilizing principles, such as the waste matters resulting from the manufacture of prussian blue and prussiates, the ammoniacal liquor of gas-works, the waste of potash and soda-works, &c. These waste matters are mixed with the absorbent powder, and used either alone or with the addition of a portion of the manure manufactured from animal remains.

The patentee makes no claim to the apparatus before mentioned, except so far as the same may be necessary to the carrying out of this invention; but he claims "the carbonic compounds, formed of the materials and in manner before specified, and the application of the same as manures."—[*Inrolled in the Inrolment Office, August,* 1847.]

To Christopher Vaux, *of Frederick-street, London, Gent., for improvements in storing and supplying beer, ale, and porter.*—[Sealed 8th February, 1847.]

This invention consists in the following method of storing and supplying beer, ale, and porter:—A vat is first constructed of wood (but any other suitable material may be used), about one inch thick, of a rectangular or other suitable shape, and 3½ feet high, 3 feet long, and 2½ feet broad. A cover is fitted to the vat, having an opening 9 inches square, and two small openings for valves formed therein; but the remainder of the cover is air-tight. Through the large opening is inserted a sheet iron vessel, of nearly the height of the vat, and of the same area as the opening, which it should fit air-tight; the top of this vessel is fitted with a thick wooden cover, and the lower part is furnished with a small pipe, which extends through the bottom of the vat, and terminates in a brass cock: this pipe can be readily removed, in order that the iron vessel may be withdrawn when the vat requires cleansing; or the whole of the top of the vat may be made capable of being taken off when required. The capacity of the vat, after deducting the space occupied by the iron vessel, is (according to the above dimensions) about 120 imperial gallons. To the two small openings in the cover of the vat two valves are fitted, one valve opening inwards, to admit air as the beer is drawn off, and the other opening outwards, to allow any excess of carbonic acid to escape: each valve should be capable of sustaining a pressure of about half a pound per square inch. The beer is drawn off by a pipe inserted about three-fourths of an inch above the bottom of the vat, and furnished with a cock; and the temperature of the beer in the vat may be ascertained by inserting the bulb of an air-thermometer (which is graduated from 40° Fahr. to 80°) therein, near the bottom.

The vat should be enclosed in another close vat or outer case, in such a manner as to admit of free access to the apertures in the lid of the vat, and so as to leave a space between the sides of the vat and its case, to be filled with powdered charcoal, coke, or other non-conducting material. The vat is placed in an elevated position in the "bar," where the beer, ale, or porter is drawn; and it may be supplied from time to time by a common force-pump, the outlet from which should be flush with the bottom of the vat: this arrangement readily admits of the vat being cleansed, by unscrewing part of the pipe from the force-pump.

In warm weather, lumps of ice, or a mixture of ice and salt, may be put into the iron vessel to cool the beer; in cold weather the beer may be warmed, by admitting steam, hot air, or hot water into the vessel; and the beer thus cooled or warmed, is drawn off, as required, through the pipe and cock at the lower part of the vat, instead of pumping it up from the cellar as it is wanted. It is evident, that the body of the beer in the vat will not be violently agitated when portions are drawn off; and it will therefore be clearer than usual; and as the surface of the beer is not agitated, there will always be an atmosphere of carbonic acid in contact therewith, which will prevent the absorption of oxygen from the air, and, consequently, render the beer less liable to turn sour. Sometimes, to obtain cool and pure air, the inlet valve in the cover of the vat is connected by a pipe with the cellar or other cool part of the building.

The patentee claims the storing of beer, ale, and porter in vats or vessels, such as above described, and in an elevated position above the bar, thence to be drawn for use. Also the employing a metallic vessel, for the ready communication of either cold or heat, as before described.—[*Inrolled in the Inrolment Office, August,* 1847.]

To STEPHEN MOULTON, *of Norfolk-street, Strand, in the county of Middlesex, Gent., for improvements in treating caoutchouc with other materials, to produce elastic and impermeable compounds,—being a communication.*—[Sealed 8th February, 1847.]

THIS invention consists in combining with caoutchouc, calcined magnesia or carbonate of magnesia, and hyposulphate of lead, and the artificial sulphuret of lead, and submitting the compound to heat, as will be hereafter described. By this invention, the use of liquid solvents may be dispensed with, and various goods may be manufactured without imbibing the offensive odour of such solvents.

The following is the process pursued by the inventor:—The caoutchouc, after having been cut up and cleansed, is submitted, in conveniently small quantities at a time, to the action of a pair of revolving iron cylinders or rollers, denominated the mixing rollers, heated internally by steam; and, by the action of these rollers, the caoutchouc soon presents the appearance of a rough parallel sheet, and is then in a proper state to be mixed with the following ingredients. If the goods, which are to be made from the intended compounds, are required to be elastic, and to be unaffected by heat or cold, the inventor mixes in with one pound of caoutchouc from one ounce to half a pound of the hyposulphate of lead, and the artificial sulphuret of lead, both, or either; but they are preferred to be in equal proportions; if, however, they are used separate, then the whole quantity mentioned will be required. When the goods are intended to be hard, of greater tenacity, and of less elasticity, from two ounces to half a pound of the calcined magnesia or carbonate of magnesia is mixed with one pound of caoutchouc, and to this compound is added both the hyposulphate of lead and the artificial sulphuret of lead, or either, in like manner and proportions as used for elastic goods.

The materials above mentioned and the caoutchouc having been passed repeatedly between the mixing rollers, so that the whole compound may be well combined (which will readily be seen by a workman accustomed to the working of caoutchouc), it is then removed to another similar pair of rollers, denominated the grinding rollers, and treated in like manner. These rollers are placed nearer together than the mixing rollers, in order that a more intimate mixture of the compound may be effected. After this second process, the compound is submitted to the action of a third pair of rollers (also heated by steam), denominated the softening rollers, whereby it is again ground or mixed, and is made fit for its final removal to the spreading machine.

The spreading machine comprises two or more iron cylinders, which are heated internally by steam (the machine which the inventor prefers consists of three rollers, one above the other), and have a smoother and finer surface than the rollers before mentioned. The caoutchouc, thus prepared, is placed between the upper rollers, and passes to a lower roller, over which the cloth intended to receive the sheet passes: the cloth thus receives on its surface the different coatings of the compound required. If sheet-rubber is desired, the compound is placed in like manner, dispensing with the use of the cloth; and the sheet is taken from the lower roller. The coated cloth, and also the sheet-rubber, when passing off the lower roller, must be rolled up in dry cloths to keep the surfaces apart. In manufacturing goods from the compound thus prepared, it will be necessary to dust the surfaces over with purified pipe-clay, finely powdered, to prevent them adhering together; but the compound is as yet liable to the action of all the solvents and other influences which affect caoutchouc; and it would, therefore, become rigid in cold, and soft and sticky in warm weather. To free the caoutchouc compound from these characteristics, it is treated with the salts of lead, as above mentioned; and the goods manufactured from this compound have now to be subjected to heat in a suitable chamber or cylinder, and heated either by steam or dry heat (the former is preferred) of from 220 to 280 or 300 degrees, according to the quantity of goods heated at one time; and also as to the thickness of the compound put into the sheets or upon the cloth.

The time required for heating goods will likewise vary according to circumstances; some goods may require three hours' heating, and some five hours, or thereabouts; but this will be easily determined by any one practically acquainted with the business. After the goods have been heated, as last mentioned, they become elastic and impermeable.

The patentee claims the treating of caoutchouc with hyposulphate and artificial sulphuret of lead, and subjecting it to a high degree of temperature, as above described. And, Secondly,—the treating of caoutchouc, by combining therewith calcined or carbonate of magnesia, and hyposulphate of lead, and the artificial sulphuret of lead, and subjecting it to high degrees of temperature, as above described.—[*Inrolled in the Inrolment Office, August,* 1847.]

To Philip Henry Holland, *of Chorlton-upon-Medlock, in the borough of Manchester, in the county of Lancaster, surgeon, for improvements in applying manure to land,—being partly a communication.*—[Sealed 16th February, 1847.]

This invention consists in a method of applying liquid manure or water containing fertilizing materials to land, through hose or pipes, by means of a moveable steam-engine and pumps, placed in a barge or boat, floating on a river or canal; or the apparatus may be mounted on wheels, so as to travel on railways or common roads.

Manures of all descriptions, or marl, lime, clay, or other substances for improving the land, capable of being dissolved or suspended in water, may be used; but the manures which the patentee generally employs are urine and night-soil, and sometimes guano. The manures or other substances are mixed with water, in suitable proportions for supplying the land with the respective elements of the intended crops: these proportions are generally one part of urine or night-soil, and from four to eight parts of water. The mixture is effected by means of an agitator, shaped like a harrow, which is moved to and fro, by the power of the steam-engine, in a water-tight compartment of the barge; but the agitation may be accomplished by means of a jet of water, or by other methods. The liquid manure is forced by an ordinary forcing-pump, worked by the steam-engine, through flexible hose, and may be distributed over the land in the form of a jet, through a flattened nozzle; the patentee, however, does not confine himself to this kind of pipe or nozzle, nor to the distribution of the liquid manure in the form of a jet, for pipes of metal, earthenware, and other materials may be used, and the liquid may be distributed through lateral perforations, or through nozzles of various shapes, or it may be permitted to issue from the open end of the pipe. Liquid manure may be distributed by means of earthen pipes, formed in moulds, and connected by screw joints.

By the apparatus described, the moisture contained in land can be readily increased; but it is proposed, in some cases, to diminish the degree of moisture, by using the moveable steam-engine and pump to remove water, by pumping, from a well, into which the land-drains enter. Supplies of fertilizing liquid may be occasionally obtained from sewers, drains, &c., and applied in the manner before mentioned. Land or crops situated near the banks of navigable rivers or canals may be more economically watered by the above apparatus than by the methods hitherto in use.

The patentee claims the employment of a moveable steam-engine and pumps, floating in a boat or barge, or moved on wheels, for the purpose of distributing manure or other substances for the improvement of the land, through hose or other pipes. Also the application of earthen pipes, with screw joints, made in moulds, for the collection, distribution, or removal of liquid manures, or of substances suspended in water.—[*Inrolled in the Inrolment Office, August,* 1847.]

To William Pidding, *of Bernard-street, in the county of Middlesex, Gent., for an improved mode of exhibiting and protecting certain colored fabrics, ornamental inscriptions, and other designs.*—[Sealed 2nd February, 1847.]

This invention consists, firstly, in enclosing certain colored, transparent or semi-transparent fabrics, or inscriptions or designs made or produced upon certain transparent or semi-transparent fabrics or substances, between two sheets of glass, the edges of which are puttied, luted, or cemented together, so as to protect the articles from the action of the atmosphere, dust, and insects; and the articles so enclosed present an appearance similar to stained glass or designs or paintings upon glass. The materials which the patentee prefers to use in carrying out this part of his invention are, colored gelatine, or thin colored gauze, or colored paper, rendered transparent or semi-transparent by any of the ordinary processes. These materials, plain or colored, may have any required design or inscription printed, drawn, impressed, or embossed upon them.

The second part of this invention consists in painting inscriptions or designs, in transparent colors, on a sheet of glass, and then applying another sheet of glass to the painted side of the first sheet, and luting or cementing the edges of the sheets together, so as to exclude the air, dust, and insects.

The patentee claims, Firstly,—the exhibiting and protecting certain colored transparent or semi-transparent fabrics, as above described, or inscriptions or designs made or produced upon certain transparent or semi-transparent fabrics, as above described, by enclosing them between two plates of glass, having their edges cemented together. Secondly,—the protecting of a sheet of glass upon which an inscription or design has been painted in transparent colors, by applying another sheet of glass to the painted surface of the first sheet of glass, and then cementing the edges of the said sheets of glass together, as above described.—[*Inrolled in the Inrolment Office, August,* 1847.]

Scientific Notices.

ON THE PROCESS OF M. ARMAND ROUSSEAU, FOR PRODUCING UPON PORCELAIN A FINE DEAD SILVER, NOT AFFECTED BY SULPHUROUS EXHALATIONS.

BY M. ALEXANDER BROUGNIART.

[*Translated for the London Journal of Arts.*]

M. ARMAND ROUSSEAU, decorator of porcelain, presented to the Society for the encouragement of Arts, Paris, specimens of porcelain, the principal decoration of which consists of wavy lines, having the appearance of dead silver. This dead silver, which is of a fine white color, being relieved by ornaments of blue or any other lively color, produces a very good effect, and presents the appearance, at first sight, of white mother-o'-pearl, or that which reflects no prismatic colors.

This application of silver on porcelain was well known before M. Rousseau's process; but the results were in general imperfect, being less pure, and possessing less metal, than the specimens submitted to the society. The dead silver, prepared and applied by M. Rousseau, admits of a very fine burnish being applied; the ground presenting the appearance of white pearl, which sets off to great advantage the ornaments painted thereon. The new process possesses, however, another advantage, of much greater importance than the above-mentioned improvements. It is well known, that by the action of air, charged with the most minute portion of sulphurous particles, silver loses, first its lustre, then its metallic appearance, and, finally, assumes a leaden appearance, approaching to black: this serious defect has caused the use of metallic silver to be rejected by all manufacturers, who wish their porcelain to be ornamented in a durable and brilliant manner. The lustre may be renewed by cleansing; but the fine dead appearance of the silver, and also the burnishing, are quite destroyed; the brilliancy of the surrounding colors is deteriorated, and the friction, however carefully the cleansing may be effected, carries off a portion of the metal, which is necessarily laid on very thin.

By M. Rousseau's very simple process, which will be hereafter described, the silver is completely protected from the injurious action of the sulphur, in whatever quantity, and in whatever state it may be. This statement is proved by various facts. The Ceramic Museum at Sevres has possessed, since the year 1845, specimens which were placed there by M. Rousseau at that time; and at the end of eighteen months, they did not appear to have undergone any change. As it was not evident, however, that they had been exposed to any sulphurous exhalations while there, I requested M. Rousseau to furnish me with an article, for the purpose of submitting it to the action of sulphuretted hydrogen gas; and he gave me the half of the tube of an opera glass, which had been in use; this was exposed during several weeks in the chemical laboratory; and the only alteration it underwent was, that it was turned slightly yellow; but this was easily removed by a little soap and water. Shortly afterwards, the same piece was, together with the pretty little box now presented to the society, fully exposed to the exhalations from a cesspool, which was being emptied; and they were both, when taken out, in their present state of freshness. From this it became evident, that M. Rousseau was in possession of the secret of giving to dead silver (which is much more easily affected by vapors than burnished silver) the power of resisting the deleterious action of the strongest hydrosulphuric exhalations.

This important object is effected by the employment of gold. A very thin layer of this metal is laid, by means of a brush, over the silver with which the porcelain is ornamented, before firing it,—when, by the help of a flux, and a cherry-red heat, the two metals are fixed on the porcelain.

This is the principle, and the mode of putting it in practice; but its success depends upon the skill and experience of the operator. For instance, the silver must be dissolved in very dilute acid, and slowly precipitated; and the metallic precipitate must be well washed. The silver is then laid upon the porcelain before being colored (or, if colored, the color must not be any preparation of gold), in a pasty state, and left for twenty-four hours, at the expiration of which time the gold is to be laid on, and the article fired at a moderate heat.—[*Bulletin de la Société d'Encouragement.*]

ON THE RELATIVE PROPORTIONS OF MACHINERY, CONSIDERED WITH REGARD TO THEIR POWERS OF WORKING.

BY M. J. BERTRAND.

GALILEO, in one of his dialogues, discusses a question, which must enter the mind of every person studying mechanics, viz., How is it that many machines, which are effective on a small scale, become inoperative when constructed on a larger scale? If it be true, that geometry is the basis of mechanics, the natural conclusion is, that as the properties of triangles, circles, or cones, or other geometrical figures, are not changed by altering their dimensions, so a large machine, constructed in exactly the same relative proportions as a smaller one, ought to be proportionately effective under the same circumstances, and resist the same causes of destruction. Galileo treats this question, with regard to the equilibrium and resistance of the materials; and it is not difficult for him to prove, by numerous examples, that the resistance of a solid system is not in proportion to its dimensions.

Newton, in his *Principia*, went much further,—he gives sufficient reason for the supposition, that two systems, which are similar in a geometrical point of view, are also similar in a mechanical point of view; that is to say, not only the lines of one system, but the speed, the forces, and the masses may be constantly in relation with the homologous elements of the other system. I think that this theorem of Newton's, which has not, to my knowledge, been reproduced in any treatise on mechanics, is one of the most useful, and, at the same time, most simple principles of science. By the following note, it will be seen, that most of the important results in dynamics may be regarded as simple corollaries; and the origin of some very important theorems of Fourier and Cauchy will also be seen thereby.

Newton's theorem is enunciated by him in the following manner:—If two similar systems of bodies are composed of an equal number of particles, and the corresponding particles are respectively similar and proportional in the two systems—if they are arranged at the same distances, and are of a given density—if they begin to move similarly in proportional times; and, lastly, if the corresponding accelerative forces are inverse to the diameter of the particles, and direct with the square of the speeds, the particles will continue to move in the same manner in proportional times.

This theorem constitutes a real theory of similitude in mechanics. It will be seen, that any system being given, there exists an infinite number of possible systems, which may be regarded as similar to it; and that, instead of a single kind of similitude, as in geometry, we may suppose four, viz., those of length, time, forces, and masses; each of these is, according to Newton's theorem, a consequence of the other three.

Newton's demonstration is admirably clear and simple; but as it is connected rather intimately with some preceding propositions, I have endeavoured to substitute therefor a proposition founded upon dynamic equations, and which does not differ mainly from the form employed by M. Cauchy to deduce from the equations of the movement of elastic bodies the laws of the vibrations of similar bodies, discovered experimentally by Savart; but this theorem of M. Cauchy, although analogous to that of Newton, cannot be regarded as a corollary of the same.

Having shewn the general theorem, to which I am desirous of calling the attention of persons occupied with the study of mechanics, I make known the numerous consequences which may be deduced therefrom, especially the laws of oscillation of simple pendulums, of centripetal force, of the vibrations of cords, of the speed of propagation of sound in various gases, and, lastly, a theorem relating to turbines, demonstrated by M. Combes, in his theoretical experimental researches relating to turbines.

From the foregoing examples, the bearing of the principle to which I have endeavored to call attention will be seen; and also the different applications of which it is susceptible. It is true that only proportional results can be deduced from it; and that, consequently, it will only serve to solve a question, when another of an analogous nature and of an equivalent analytical difficulty shall have been solved. It may, however, be of great utility to determine in certain cases the analogy which exists between the movements of two systems, even supposing each of them not to be susceptible of strict theoretical determination. For instance, this principle ought to be employed whenever it is desirable to ascertain, by experiments on a small scale, the value of a mechanical invention, which is too expensive to put in operation on a large scale. Suppose, for instance, that the experiment desired to be made relates to the action of a locomotive engine, and that the most convenient way of trying it is by means of a model, the geometric dimensions of which are a times smaller than the size at which it is required to work it;—it is evident that the similitude of the masses, and of the forces between the two, must be a^3, and consequently, that of time equal to $\sqrt{a}$; so that the speeds will be as $\frac{a}{\sqrt{a}}$ to unity; that it is to say, proportional to the square root of the dimensions. The forces of gravity, moreover, are not in this instance the only forces applied to the two systems; and it is essential that the other forces be also in the proportion of a^3 to 1; consequently, the pressures exerted by the steam upon the homologous surfaces, must bear that proportion; and to that end, their tension, supposing the surfaces to be equal, must be in the proportion of a to 1. The sliding friction being in proportion to the pressure, it will give a just proportion; but the rolling friction being in an inverse ratio to the diameter of the wheels, would be too great in the small model; and this would produce an error which it is impossible to avoid, but which it is very essential to know; the resistance of the air, being supposed in proportion to the surfaces and the squares of the speed, would be modified in either case, so as not to affect their similitude. If, for instance, a model were made one-fourth the real size, it would be necessary, in order to assimilate them, to drive it at only half the speed, and for that purpose, to work the steam at only half the required pressure, and make the wheels of such a substance, that its co-efficient of friction shall be one-fourth of the large engine. It would also be necessary to establish a suitable proportion (easily calculated) between the springs in the small engine, and similar ones in the large engine.

I am not aware that these precautions have been taken, when it has been desired to experiment with small models.—[*Comptes Rendus.*]

ON THE APPLICATION OF A ROTATING PENDULUM TO CLOCKWORK.

BY M. LEON FOUCAULT.

THE piece of mechanism which I have the honor to present to the Academy, is intended to effect what is much required for astronomical and philosophical purposes, viz., a uniform, continuous, and measured movement.

The watches and clocks now in use, by their precision in working, fully answer the purpose of measuring time; but the movement which they communicate to the hands is very far from being perfectly continuous. Not only the hands, but all the moving parts of clocks and watches, are alternately in motion and in a state of repose; and if the movement of the hands of a watch be put forth as a specimen of continuous motion, it must be remarked, that this uniformity only applies to the mean speed of the wheelwork, and that it disappears as soon as the movements which take place in consecutive seconds are considered. This intermittent motion in clockwork is not by any means considered as a defect; as in the ordinary transactions of life it is unnecessary to know the time to a second or a half second; and in cases where it is required to measure the time with exactness, the regular pulsation is a great help for mentally subdividing the known intervals of time which separate them. It will thus be seen that, far from considering the periodical movements of the wheelwork of chronometers as injurious, they ought to be considered as extremely important.

There are, however, circumstances in which (the application to the purpose of measuring time being set aside) it is desirable to imitate as closely as possible the movement of the heavenly bodies, in which there is no intermittence, but absolute continuity and regularity. If it be required, for instance, to direct a reflecting mirror, so as to fix a pencil of solar light, a movement must be communicated to the mirror, if not as uniform as that of the sun, at least continuous enough to perserve the stability of the light.

But the necessity for this species of movement is most especially felt when it is desired to keep a star in the very narrow field of a powerful telescope. The movement communicated to the instrument must in that case be very regular, as its amplifying power would increase the small divergence which might take place between the direction of its optical axis and that of the point in the heavens.

Several apparatus, under the name of *parallactic* instruments, have been constructed for the purpose of moving telescopes in accordance with the apparent movement in the heavens. In order to communicate the requisite movement to the apparatus, it was imagined that clockwork of the ordinary description was the most suitable, which, working with an escapement, necessarily produced a regular motion. As, however, it was important to preserve the regularity, and at the same time destroy the intermittence of the movement, instead of causing the clockwork to act direct upon the telescope, a regulating apparatus was interposed, for the purpose of neutralizing as much as possible the jumping movements of the clockwork, and obtaining a continuous movement from a series of regular impulsive motions. It is upon this principle that the equatorial apparatus at the Observatory in Paris is constructed; and although that fine piece of mechanism, which came from the hands of Gambey, has always worked in a satisfactory manner, it is not now considered as solving the question definitively: its defect is said to be great complexity; and another parallactic apparatus for the observatory being required, of much larger dimensions, a question has arisen as to the nature of the mechanism which should be applied for the purpose of moving it.

Under these circumstances it appeared to me that this was a favorable opportunity for undertaking the construction of the novel mechanism now presented to the Society. On inspection, it will be seen, that the model is a new arrangement of clock, which produces in a direct manner a uniform, regular, and continuous movement, eminently suited for a parallactic apparatus. This continuous movement is attained by substituting a *rotating* pendulum* for the ordinary one; by which arrangement the escapement, which acts by putting the wheelwork momentarily and periodically in communication with the pendulum, may be dispensed with. The escapement is no longer required where the rotating pendulum is employed, as it is kept constantly in communication with the wheelwork, which will run down in a continuous and uniform manner; this will be evident by watching the progress of the second-hand, fixed upon one of the shafts of the wheelwork.

The idea of the revolving pendulum is not new, for we may trace it back as far as the time of Huygens; but it has never been, to my knowledge, applied in a tangible and effective manner.† The oblivion to which this pendulum has been consigned, may be traced to various causes. In the first place, the ordinary pendulum, when applied to the purpose of measuring time, was found to perform that duty in so simple and effective a manner, that improvement was scarcely deemed necessary. Secondly,—there appeared to be some difficulty in suspending the rotating pendulum. Thirdly,—there appeared also to be considerable difficulty in practically adapting the mechanism which ought to perform the same functions, in connection with the rotating pendulum, that the ordinary escapement performs in relation to the ordinary pendulum. In fact, the office of the escapement is a very delicate one,—that of transmitting from the wheelwork to the pendulum the small amount of power necessary for keeping it in motion, without influencing the duration or limiting the extent of the oscillations. We may add, that there is another difficulty connected with a rotating pendulum, viz., that of keeping its movement perfectly circular.

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* The inventor has used the term "conical pendulum," from the figure which it describes when working; but to prevent obscurity we have substituted the word "rotating."—*Ed. Lond. Jour.*

† A similar pendulum is employed in Siemen's chronometric governors for steam-engines.—*Ed. Lond. Jour.*

I have before observed, that there are other astronomical uses to which clockwork is applicable besides that of measuring time. I will now explain the mode of suspension which I have adopted for the pendulum; and also the mechanism which I employ for transmitting motion from the wheelwork to the pendulum, and giving it a tendency to revolve.

In order that a cone may be generated by the movement of a pendulum, it must oscillate round a point in two rectangular planes. Cardan's method of suspension seems to fulfil these conditions, especially when knife-edges are employed; but this increases the complexity of the mechanism, and causes obstacles to the attainment of great precision. I have preferred having recourse to another mode of suspension, which I have described in detail in my memoir, and which bears some analogy to that of Cardan, but is more simple and more easily constructed. The pendulum, thus suspended, will move round a certain defined point in all directions, and may consequently move in a circle round a point in a vertical line with, but below, the point of suspension. In order to give an idea as to how the movement is communicated to it, the last moveable wheel must be represented as being placed immediately above the point of suspension, and carrying at its lower extremity a kind of finger, which presses upon the upper end of the pendulum rod, which is extended for that purpose. From the manner in which this finger presses on the upper end of the pendulum rod, it would be imagined at first that the pendulum must gradually lose its revolving motion; this is, however, found by experience to be erroneous; and upon taking into consideration a peculiar kind of friction, which necessarily accompanies the action of this finger, it will be seen that that friction is the actual and effective cause of the regularity in the movement of the mechanism. Moreover, in order to shew how effectually it is capable of regulating itself, it is only necessary to communicate a different motion to it. Its regular progress being thus interrupted, it will be seen to describe ellipses of greater or less extent; at the same time the second-hand, by its jumping movement, shews the disorder which has been caused in the working of the mechanism. The ellipses, however, gradually dilate, the jerks of the hand subside, and, at the end of a few minutes, a regular movement succeeds to the momentary disorder.

Without wishing to enter into a description of all the minor details which ensure the efficient working of the mechanism, I may here mention the arrangement which has been adopted to set the pendulum in motion, and for receiving it when its motion is suspended. The pendulum consists of a piece of metal, with a rod running through its centre, and projecting below the body of the pendulum to about a quarter of an inch. When the clock is in motion, this rod, by its movement, describes a circular space; and in this space a circular plate or disc is mounted, the centre of which is immediately under the centre of the clockwork: a rotary motion of any required velocity may be communicated to this plate by hand. By this arrangement, if the power fails, the pendulum will stop; and instead of changing the direction of its movement, as would be the case without the plate, it will rest upon some part of the outside of the plate: thus it will be seen, that the pendulum, even in a state of rest, deviates from a vertical line in a degree which is determined by the diameter of the plate. By this means the upper part of the pendulum rod is prevented from coming in contact with, and spoiling the action of, the shaft of the last pinion.

Moreover, on winding up the clockwork, this plate offers great facility for communicating a circular movement to the pendulum, and in a much more certain manner than could be done by hand. It is only necessary to turn the plate, with a gradually increasing speed, until the pendulum is observed to quit the edge of the plate, and continue to revolve independently. As, in all probability, there will be some advantage in giving considerable weight to the pendulum, it was important to find a simple means of starting it in a circular direction; as otherwise, by reason of its weight, considerable time would have elapsed before its motion became regular, which would have been very inconvenient in the applications for which it is intended.

It now only remains to state in what respects the new mechanism differs essentially from that invented by Huygens, about the year 1673, and which, as acknowledged by the inventor himself, never worked in a satisfactory manner.

Huygens also placed the axle of his last wheel in a vertical position. This axle, turning freely on its two pivots, was longer than the pendulum, and was sufficiently strong to support all its weight. The pendulum was not fixed directly to that axis, but to the edge of a blade fixed thereto, the profile of which described a development of the parabola. In order to reach its point of connection, the pendulum-rod, which was merely a flexible rod or blade, passed through a vertical slot in the axis. In its rotary motion the axle carried round the pendulum, which, by the effect of centrifugal force, deviated more or less from the vertical, describing a segment of the parabola: its real length, reckoned from the point when the rod disengaged itself from the slot, varied in the required proportions for obtaining perfect isochronism.

This ingenious construction, compared with that which is now proposed, presents some fundamental differences. The pendulum, bearing with all its weight upon the axle from which it derived its motion, must of necessity have been very light. Its weight being very inconsiderable, its oscillations would be of very great extent; and, in order to obtain isochronism, it was necessary to vary the real length of the pendulum, by rolling up or extending its flexible rod, on the development of the parabola required. Lastly,—what causes this pendulum to bear resemblance to the regulator by centrifugal force is, that its mass turns once upon itself at the same time that it performs a revolution round a vertical line.

My principal object in recurring to a very different arrangement was, principally, while changing the nature of its movement, to preserve the ordinary properties of the pendulum, confirmed by long experience. I have also preserved the delicacy, lightness, and freeness of movement, which is ordinarily met with in the escapement-wheel.—[*Ibid.*]

RULES OF PRACTICE IN THE PATENT OFFICE OF THE UNITED STATES.

For the following official circular, we are indebted to the *Eureka*, a monthly journal, recently established in New York, and devoted to the consideration of Science and the Manufacturing Arts.

It would seem that the Commissioner of Patents possesses the power of enforcing such regulations, from time to time, as give a new aspect to patent matters. A rule of great importance to the foreign inventor has been recently put in force, as will be seen below, viz.,—that applications for patents from abroad will take precedence of those of American citizens, and therefore there will be an end to the delays, which have created considerable dissatisfaction on this side of the water.

RULES OF THE PATENT OFFICE.

1. *Caveats.*—Caveat papers cannot under *any circumstances* be withdrawn from the office, nor undergo any alteration after they have been once filed.

2. Additional papers relating to *the invention* may be admitted under the same file, the date of the reception of such papers being noted.

3. In case of filing papers additional to an original caveat, the right to notice of such papers expires with the caveat; and any additional papers, not relating to the invention as first caveated, are not entitled to notice.

4. Caveat papers once filed cannot be inspected by the caveator, nor any other person than those duly authorized by law to examine such papers.

5. The caveator, or other person properly authorized by him, may at any time obtain copies of the caveat papers at the usual rates.

6. It is desirable that caveats should be explicit as to the character and features of the invention, embrace suitable drawings or sketches, and a model, if convenient. The caveat fails of its purpose when the invention is not explained.

7. Models are always retained by the office.

8. Applications are examined in the order of their reception; except in cases in which the claims so nearly resemble those undergoing examination, as to render an interference probable; in which case they will be taken up and examined with the cases then under examination.

9. Rejected applications may be reconsidered at the request of the applicant, and explanations, whether verbal or in writing, may be at any convenient time received by the examiners; but final action upon such cases cannot be had until they come up in their turn as cases presented anew.

10. In case specifications and drawings should be found defective, they are returned to the applicants with instructions to amend. When returned to the office they are again examined, the examination in such cases taking precedence of all new cases on hand at the time of their reception. But if on such examination it should be found that the instructions to amend have been disregarded, or not properly attended to, the papers are again returned to the applicant, and, upon their second return to the office, the examination of such papers is delayed until all the business on hand at the time of their reception is disposed of.

11. When papers are thus returned to applicants for amendment, should they find it necessary or deem it important to prepare a new document, in order to make suitable amendments, *the original papers must be returned to the office, together with the amended or new papers*, otherwise examination upon such cases will be delayed until the original papers are received by the office.

12. After an application has been examined, no alteration made in the character of the invention can be considered under the same fee; but such alterations will require a separate fee, papers, &c., before examination can be had.

13. In general, if any addition is to be made to an invention duly before the office, or any change in its character, the applicant must withdraw and file his application anew.

14. All explanations or suggestions by patent agents, in relation to cases pending before the office for examination, must be in writing, addressed to the Commissioner.

15. All patents will be delivered or sent by mail to the patentee,

except when a *written order* has been deposited by him in the Patent Office, directing the delivery to some other person.

16. When an application has been *finally decided*, the office will retain the original papers, allowing the applicant to obtain copies thereof.

EDMUND BURKE,
Commissioner of Patents.

FOREIGN PATENTS AND RE-ISSUES.

Applications for inventions, *which have been patented* in a foreign country, will be taken up for examination immediately after all the necessary papers and drawings have been filed, the fee paid, and the model deposited in this office. As the letters patent issued in this country, for inventions patented abroad, bear date with the foreign letters patent, this rule has been adopted with the view of giving the longest term to the patent in this country.

For a similar reason applications for the surrender and re-issue of letters patent will be examined immediately after they shall have been completed.

PATENT AGENTS, OR ATTORNEYS.

In this city, and some of the other cities of the Union, individuals have undertaken the business of preparing applications, drawings, &c., for procuring patents, under the professional title of "Patent Agents," or "Patent Attorneys;" from which circumstance many have supposed that such persons have some connection with the Patent Office, official or confidential.

It has also come to the knowledge of the undersigned, that some individuals, officiating in the character of patent agents, have pretended to possess an influence with the Patent Office not accorded to others, by which they are enabled to obtain patents in cases in which they have been refused to others. And, also, that persons acting in the character of patent agents, have charged the results of their own inattention, perhaps incompetency, to the negligence of the Patent Office.

These circumstances render it necessary for the undersigned to advise all persons having business with the Patent Office, of the precise relations which patent agents hold with this office.

The Patent Office recognises no official or confidential relations with patent agents or attorneys whatever. It does not concede to them any favors or privileges which are not granted to all other persons; and any pretensions to the contrary, (if any such are made,) are, of course, without foundation.

The only class of agents employed by the undersigned are those persons who have been authorized, in several of the cities of the Union, to receive and forward models, &c., to the Patent Office, and their connection with the office begins and ends with that employment only.

This explanation is not made with any design to reflect upon such persons as have undertaken the business of patent agents in this city, or elswhere, but only with the view of vindicating the Patent Office from any imputation which may grow out of the circumstances above alluded to, and of asserting the integrity and impartiality of its administration.

To relieve applicants from the necessity and expense of employing agents to transact their business with the Patent Office, so far as it is in the power of the office to do so, the examiners are instructed to decide the questions of the novelty and patentability of inventions upon papers imperfectly prepared, if they are sufficiently perspicuous to enable them clearly to understand the invention claimed, *when such papers are prepared by the inventor without the intervention of an agent.* But, if an agent be employed, it being presumed that he is qualified for the business which he undertakes, and needs not, nor is entitled to, instructions in relation to it, the office (which has not the time, nor is bound by law in *any* case to give instructions) will, in all cases, leave it to him to prepare and present the claims of the applicant, and will decide upon them as they are presented.

Inventors, who are desirous of examining the models in the Patent Office before making application, should carefully avoid all persons hanging about the office and offering their service as agents, or to examine models; but they should, in all cases, apply to the Commissioner, or Chief Clerk, who will direct the machinist to aid them in making a thorough examination of the models belonging to the class of inventions which they desire to see. This caution is given to enable inventors from abroad to avoid the misinformation and impositions to which they are exposed, from persons lying in wait for them about the Patent Office, and tendering their services as patent agents, or the procurers of patent agents. If the services of patent agents are desired, able and competent persons, engaged in that business, can be found *at their offices* in this and other cities.

STATE OF BUSINESS IN THE PATENT OFFICE.

It is deemed expedient to apprise all persons having business with the Patent Office, that so great has been the increase of business during the last two years, as to have rendered it impossible for the office, with its present examining force, to keep up with it.

The last addition to the examining force was authorized by act of Congress in 1839. By that act the Commissioner was authorized to oppoint two assistant examiners in addition to the two principal examiners then in the office. And from that time to the present, the examining force has consisted of two principals and two assistants.

In 1840, the first year subsequent to the enlargement of the examining force, the number of applications for patents was 765; number of caveats filed, 228. In 1846, the number of applications was 1,272; number of caveats filed, 448; thus exhibiting an increase of business equal to 80 per cent., *without any addition to the examining corps.*

The business of the office has increased in a greater ratio during the first four months of the present year; and, as a necessary consequence, the embarrassments and delays of the office must increase.

Convinced of the necessity of an addition to the examining corps, Mr. Ellsworth, the late commissioner, in his report of January, 1845, brought the subject to the attention of Congress, and urged, with appropriate reasons, the necessity of such addition. In my report in January, 1846, I repeated the recommendations of my predecessor. And before the close of the session of Congress of that year I again, by letter to the Committee of the Senate on the Patent Office, urged the absolute necessity of increasing the examining force. Again, in my annual report of January, 1847, I reiterated the recommendations on this point so often made; and again, before the close of the last session, I called the attention of the Committee of both Houses to the great embarrassments of the office, and delays of the business of applicants, resulting from want of force in the examining department; *but Congress did not deem it essential to legislate upon the subject.*

Therefore, the embarrassment and delays growing out of the want of a necessary examining force must continue to increase, until Congress shall see proper to grant the additional aid, which the great increase of the business of the office absolutely requires. The force of the office is tasked to the utmost, but it cannot perform impossibilities.

At present, the business in the examining department is behind quite three months. It will continue to get more and more in the arrear, until relieved by Congress.

When it is considered that the Patent Office is sustained solely by fees collected of inventors, and that it now has nearly 200,000 dollars to its credit in the Treasury, the undersigned is not surprised that applicants complain of the injustice which they suffer by the delays which, for the reasons above stated, they will see are inevitable in the present condition of the office. But, in justice to himself and those under his supervision, he is bound to say, that the present embarrassed condition of business is not chargeable to the officers of the Patent Office.

EDMUND BURKE,
Commissioner of Patents.

PURIFICATION OF MERCURY.—BY M. MILLON.

Mercury may be perfectly purified by agitating it for a considerable time with weak nitric acid. With two pounds of the metal about an ounce and a half of the acid diluted with twice its volume of water may be employed. The mercury freed from the nitrate thus formed, is to be boiled with pure nitric acid sufficient to dissolve about nine-tenths of the metal; the resulting nitrate of mercury is to be reduced to red oxyde by heat, and this is to be calcined in a porcelain retort to reduce it.

By the action of the first portion of nitric acid, the more oxydable metals are acted upon; the second portion of acid leaves the metals less oxydable than mercury in the undissolved portion.

As the mercury, reduced by this process, dissolves a notable quantity of oxyde, this last is to be separated by agitation with sulphuric acid; it is afterwards to be washed with a very large quantity of water, and dried in the receiver of the air-pump over sulphuric acid. Mercury, thus purified, was employed by M. Regnault in his third determination of its density.

M. Millon states, that when a saline solution, such as chloride of calcium, hydrochlorate of ammonia, nitrate of potash, &c., is added to mercury in a bottle, the mercury is always divided into rounded globules, which remain separated from each other for a long time; but what is very striking is, that the size of the globules, which varies enormously, is always connected with the nature of the aqueous solution. Some solutions immediately cause extreme division in the mercury; others, on the contrary, produce only very large globules, to whatever extent the agitation may have been carried; and the same effect is always produced with the same solution. It is to this influence of saline solutions that is due the difficulty often witnessed in collecting mercury when it has been reduced in the moist way.—[*Ann. de Chim. et de Phys.*]

GROVE'S GALVANIC BATTERY, IMPROVED FOR THE USE OF THE TELEGRAPH.

To increase the power of this battery, it is common to amalgamate the zinc cylinders with mercury. In the use of the battery at the stations of the telegraph, the mercury is soon attacked by the nitric acid, which passes through the porous cup, or by impurities in the sulphuric acid, and perhaps by both. It thus became necessary to repeat the amalgamation daily, or every day or two, at no inconsiderable expense from the oxydation of the mercury.

In trying some experiments, Mr. Swan, of this city, was led to put crystals of sulphate of soda into the diluted sulphuric acid, when he found the action to be more uniform, and the mercury to be unattacked. On making the trial of the sulphate of soda in the telegraph battery, the experiment was entirely successful, and the amalgamation was not repeated for weeks. In the new line on the Canada shore, it is stated by the superintendent that they began with the use of the sulphate of soda, and that the quicksilver appeared uninjured after weeks of use. Should this fact be established, the saving on the telegraph lines will be some thousands of dollars annually; indeed, the experiments are already conclusive. The result is probably due to the decomposition of the sulphate of soda, by which nitrate of soda is formed and sulphuric acid liberated, while the nitric acid is thus prevented from acting on the quicksilver. There may be other effects; but the advantage gained from the sulphate of soda is very great. The crystals of sulphate of soda must be renewed so often, that the dilute sulphuric acid may be a saturated solution.—[*Silliman's Amer. Jour.*]

ON FREE ELECTRICITY.

By Robert Hare, M.D., Professor of Chemistry in the University of Pennsylvania.

Practically there is a striking difference between the excitement of an electrified insulated conductor (the prime conductor of an electrical machine, for instance), and the charge of a coated pane or Leyden jar. In the one case disruptive discharge is productive of a comparative short thick spark, in the other of a spark distinguished by comparative length and tenuity. The discharge from the pane or jar is productive, for equal surfaces, of a much greater shock than could result from a spark ten times as long, from the conductor of the machine by which the electricity is generated. And yet, if the intensity be inversely as the square of the striking distance, it must be a hundred times as great in the case of the conductor, as in that of the coated surfaces.

Electricity, as it exists in the conductor, has been called free—as it exists about the coated pane, has been called simulated or disguised. Yet Faraday has alleged "that the charge upon an insulated conductor in the middle of a room, has the same relation to the walls of that room, as the charge upon the inner coating of a Leyden jar has to the outer coating of the same jar." "The one is not more dissimulated than the other." "As yet no means of communicating electricity to a conductor, so as to place its particles in relation to one electricity and not at the same time to the other, in an equal amount, has been discovered."

It seems to me that these opinions of Faraday have been judiciously criticised by Mr. Goodman in the London and Edinburgh Philosophical Magazine and Journal, Vol. xxiv, p. 174.

It appears likewise that opinions harmonizing with those of Mr. Goodman, have been entertained by Charles V. Walker, Hon. Sec. L.C.S., as may be seen in the Proceedings, Dec. 20, 1842. Agreeably to Mr. Walker, lightning resembles the discharge from a prime conductor, not that which takes place between the surfaces of a coated pane or jar.

I will proceed to state the considerations which induce me to concur in opinion with Mr. Goodman and Mr. Walker.

If two sufficiently remote insulated metallic discs, such as usually enter into the construction of an electrophorus, by due communication with the rubber and collecting points, be made to serve, one as the positive, the other as the negative conductor of an electrical machine in operation, a diruptive discharge from either may be obtained, by the approximation of an uninsulated conducting body, or one communicating with one conductor while approximated to the other. When this discharge takes place from a small knob on the positive side, to a large one on the negative side of the circuit, the resulting spark is comparatively long, and, by its zigzag form, represents lightning in miniature.

If, in the next place, a sufficiently large pane of glass being interposed, the discs be made to serve as a coating to the glass, the surfaces of the pane which they touch will become oppositely charged. If, immediately after the charging is effected, both discs being insulated, the knuckle of the operator, or any other conducting body in communication with the earth, be approached to either disc, a spark will pass, and, on contact, a certain portion of electricity will be discharged. This is what I would call free electricity; but on making a conducting communication between the discs acting as coatings, a much larger discharge of electricity will take place. This is what I would call neutralized or dissimulated electricity. But the ratio in quantity of the latter to the former varies evidently with the thickness of the pane or panes which may be interposed; so as to be inversely as the square of the distances of the charged surfaces. If a stratum of air perform the part allotted as above to the panes, the same law must hold good. But when, instead of flat discs, corresponding in size and shape, we substitute a cylindrical or globular metallic mass, such as is generally used for the prime conductor of an electrical machine, on the one side, and on the other side the walls, floor, and ceiling of a room, for the other surface, evidently the ratio of the free electricity to that which can be neutralized must be enormously great. Supposing the glass pane to be one-tenth of an inch in thickness, the distance between the surfaces of the conductor and the parietes of the room to be ten feet, the quantity of electricity neutralized in the case of the pane will be to that neutralized in the case of the conductor as the square of one to the square of twelve hundred inversely; or, in other words, nearly as a million and a half to one. It follows that, in the phenomena of discharges from a prime conductor, the neutralizing or dissimulating influence of the conducting superficies opposed to it must be too small to be regarded.

The allegation of Faraday, that no mode has been discovered by which to place the particles of a conductor in relation to one electricity, and not at the same time to the other, is verified, as Mr. Goodman has observed, when the friction between the rubber and glass takes place. The glass becomes positive to precisely the same extent as the rubber becomes negative; but when the vitreous surface, thus excited, moves away from the rubber, the compensating electricity of the rubber being no longer at hand, that upon the glass cannot realize Faraday's idea, excepting so far as it may be competent to act upon the walls, ceiling, and floor of the apartment, as electricity on the inner surface of a Leyden jar acts upon the outer surface. But, in the case in point, the electric interposed is so enormously thick, compared with the glass in a Leyden jar, that very little of the inductive influence can avail to produce an opposite state tending to neutralize the electrical excitement "to an equal amount."

Just so far as it can produce an equivalent opposite state, it becomes dissimulated or neutralized; so far as it does not, it is free, or in other words, exercises that uncompensated activity which has, in my opinion, justified the distinction made between free and dissimulated, neutralized or latent electricity.

It will be perceived that I concur with Mr. Walker in the opinion, that, on account of the distance of thunder-clouds from the earth, the electricity which they may acquire is too remote from the terrestrial surface to induce in this an opposite electrical state, capable of neutralizing the electricity of the cloud beyond a minute proportion.

There seems to be an obvious means of discrimination between free and neutralized electricity, in the fact, that the one is associated with the surface of a conductor, so as to accompany it when moved, while the neutralized electricity is inseparable from the superficies of the electric, through the intervention of which it exists. It is well known that the coatings of a pane or jar may be removed without disturbing the charge which may have been imparted by their presence. Yet, if removed after the pane is fully saturated, each coating will hold a charge which it will give out in a spark to any uninsulated body, without any reference to the other coating which may meanwhile be remote and insulated from all communication with it. The spark, thus yielded, has the characteristics of free electricity. Having served as a part of the conductor, with which it had communicated, the coating is surcharged in proportion to its capacity, and gives up the redundancy on communicating with the earth, without any reference to the other coating. The spark, thus given, I conceive to have the characteristics of free electricity.

In the case of electric accumulations in the atmosphere, there can be no substitute for the service performed by glass in Leyden charges, but that which air can render; and it can hardly be conceived, that, while agitated, as it is during thunder-gusts, a stratum of that fluid can perform the part of a glass pane. [*Ibid.*]

REPORT OF AMERICAN PATENTS.

From the "Journal of the Franklin Institute."

BY MR. C. M. KELLER.

To David Percival, *of Middletown, Delaware, for an improvement in the gate for railroads.*

This gate is so constructed as to slide vertically, and is connected with inclined beams on the side of the rails, which, when depressed by the passage of a car over them, depress the gate, and then permit it to rise when the car has passed.

The patentee claims the combination of a balance gate with a railroad track, by means of vibrating beams, combined, constructed, and operating with the same, substantially in the manner and for the purpose set forth.

To Thomas F. Wenman, *of New York, for an improvement in the filtering cock.*

The valve of this cock is a hollow cone, divided into two chambers by a filtering partition, so that the liquid in passing through shall be filtered.

The patentee claims the application of the filter within the inner cone of the cock, by means of a groove made in the inner cone; also, on the bottom plate placing two perforated plates, with the filtering substance between them, so that all the water, or other fluid, has to pass through the plates and filtering substance, for the purpose described.

To James Hibson, *of New York, for an improvement in the method of constructing trunks.*

This improvement refers to the skeleton, or framework, of travelling and other trunks, and to the mode of connecting the exterior covering thereto. Instead of constructing the ribs (which constitute the skeleton of such trunks) of wood or metal, the inventor employs strips of whalebone, which, by their elasticity, preserve the original shape of the trunk, after it has been subjected to wet or accidental pressure. These strips, when bent to the required form, are secured to the iron lips of the trunk by having their ends inserted into sockets formed of sheet metal, and rivetted to the lips. The lips are united at one side, by metallic or other hinges, in the usual manner. To connect the outer or leather covering to the skeleton, small clamps, made of thin sheet metal, are used.

To Patrick Fitzsimmons, *of West Troy, New York, for a process for purifying or cleaning whale oil.*

For the purpose of precipitating the gelatine and albumen, finely pulverized alum is mixed with the oil. The proportion of alum for a hundred gallons of oil is from fifteen to twenty-five pounds, according to the quality of the oil.

The patentee claims the method of separating the impurities from whale and other animal oils by means of alum.

To WASHBURN RACE, *of Seneca Falls, New York, for an improvement in the self-acting register for stoves.*

AN expansion-rod is connected at its lower end by a knife-edge with a lever, which is in turn connected with the register, so that as the rod contracts by the reduction of temperature, the register is opened, and *vice versa.*

The patentee claims combining the expansion-rod, with the register or valve, by means of the lever,—the whole constructed and operating in the manner and for the purpose above set forth, whereby the ordinary connecting joints are avoided.

To THOMAS GLASCO, *of Wilmington, Delaware, for an improvement in railroad wheels.*

THIS is for a mode of fastening the tyres of railroad wheels to the main rim, or "centre," as it is termed in the specification. The outer periphery of the centre is made conical, to fit the correspondingly-formed inner periphery of the tread; and the outer periphery of the centre or inner rim is grooved to receive a ring cut in three parts; so that when the outer rim or tread is slipped on, by means of radial screws, the segments of the ring can be forced into a groove in the inner periphery of the outer rim; one face of the segment ring being bevilled, so that, when forced out, the segments shall act as wedges to force the outer on to the inner rim.

The claim, under this invention, is the mode of connecting the centre with the rim by the circular wedge, which is divided into three parts; and fastening the same by screws.

To C. S. DEBOW, *of New York, for an extension frame for bedsteads.*

THE patentee says:—"The distinguishing character of my invention is the employment of the well known series of cross levers, familiarly known as 'lazy tongs,' placed in a horizontal position, but turned edgeways, for supporting, while they can be contracted or extended at pleasure; any number of these being placed parallel, and at a sufficient distance apart, for the purpose intended, and connected by cross bars for purposes above named; when extended, forming a bedstead or other supporting frame; and when contracted, occupying the smallest possible space."

To JONAH F. OSTRANDER, *of New York, for an improvement in mills.*

THIS invention consists in forming the surfaces of the stones or metallic plates, between which the material is ground, the one convex, and the other concave; the convexity and the concavity being hemispherical, or of the form of spherical segments, and giving the moveable plate or stone a compound movement, consisting of the following motions, viz., an oblique gyrating motion of its axis around the axis of the fixed plate, and of a rotating motion around its own axis.

To Josiah Warren, *of Harmony township, Indiana, for a composition of matter to be used as a substitute for type metal, and on which impressions can be made with types, &c.*

The following is a copy of the specification entire:—"Moulds, or matrices are made of a tough strong clay, mixed with silex in impalpable powder, in sufficient quantity to prevent cracking. These materials are made with water into a strong putty, and kneaded very thoroughly, until it has acquired all the toughness that can thus be imparted to it. This mixture is now softened with water, till it will spread easily and smoothly upon a metallic plate; the thickness of coat varying according to the work to be done, from the thirtieth to the tenth of an inch. The plates, thus coated, are allowed to become about half dry, so that a type impressed into them will leave a smooth *fac-simile* of itself. Into this coating forms are impressed, as hereafter described in stereotyping plates. These forms may either be an original design or impressed by an original, to obtain a copy. When the coating is required to continue moist a longer time than the above, a heavy coating, with additional silex, from a twelfth to an eighth of an inch thick, is first spread upon the plate, and immediately afterwards, the coating first described is spread upon the under coating. It is well to spread, with a light brush, a little thin gum Arabic paste between the two coatings, but not indispensable.

"The above-described matrices are used for music, maps, and similar open work; but for fine, close, or shaded work, and for writing, the coating should be of very fine clay, without any admixture of silex, more than is chemically combined to form the clay. This clay should be of such a nature as will admit of its being spread in the form of a thin mortar, to the thickness of one-thirtieth of an inch, without shewing any cracks in drying. Clay of this quality is found along the banks of the Ohio river, near Evansville, Indiana.

"When the coating is intended for a close *italic* handwriting, it may be spread with a tool so constructed as to leave furrows in the surface, at such suitable distances as the writer may desire to have his lines; when this becomes hard enough to cut without following the tool, it may be slightly brushed over with a little olive or linseed oil. The writing is done in the furrows with any suitable tool.

"To write a copper-plate, or running hand, or for close drawings, the following is a good process:—Mix a small quantity of gum Arabic paste with the mortar made of the pure clay, as above described, enough to change the color of the clay a shade darker when dry. Let this coating get quite dry, and brush it over slightly with oil; with another brush moisten each line or furrow before writing on it. The writing may be done in the ordinary manner, never allowing the tool used to go quite down to the foundation plate. The cast from this matrix will present a slightly uneven surface, which may be gently ground down with a hone or fine whetstone.

"The following process may be used as a substitute for the method above described:—Spread a plate with pure clay, say one-thirtieth of an inch thick, or as thick as will dry without cracking; and when dry, heat it sufficiently to melt wax. Then rub over the surface a little bees' wax, stearine, or tallow, and allow the plate to cool. When cold, spread on another coating of pure clay, in which a little olive or linseed oil is thoroughly mixed. This should be worked on as soon as it is sufficiently dry to allow the tool to work freely.

"A great variety of clouded, wavy, or smoky effects, either as parts of a picture, or as tinted grounds, are instantly produced in a matrix by wetting the surface to a creamy softness and applying a brush, or toothed tool, with such motion as may be adapted to the design. This may be termed the *Hylographic process.*

"Type composition, or *silicate of lac*:—Take one pound of good shellac, say four ounces of good clean tar, melt together over a gentle fire, and then stir into this mixture two pounds of fine siliceous sand. When thoroughly mixed, turn out and flatten into thin sheets, say an eighth of inch thick; when cold it may be broken up for use. Place the matrix over a very gentle heat, in order to expel all dampness; raise the heat a little short of the hissing or boiling point, then lay over the matrix pieces of the silicate sufficient to cast a plate an eighth of an inch thick. Lay upon this a wooden block of the length and breadth required, and about three-fourths of an inch thick. When the silicate is sufficiently softened to take the impression, take the whole to the press. Strips of wood, or other material, should be placed upon each end of the matrix plate, as guides or bearers, so that the cast shall be exactly *type height.* This being done, bring the press gently down upon it, until the bearers stop it. When cold, remove the cast from the matrix plate, and with a brush carefully wash the face of the cast without wetting the back of the block. The face of the cast or type may be polished with a hone or other suitable substance. It is now ready to take a proof, and, if perfect, is ready for the press. If not perfect, mark the imperfection on the proof-sheet, to be corrected by the following process of—

"*Stereotyping*:—Take a metallic plate, previously spread with the coarse under coating, say four of fine sand to one of clay, covered with a coating somewhat finer, as first described; when this is so dry as to leave a clean impression from a type, it is ready for use. Next secure the imperfect cast of the type firmly in a square frame, or printer's *chase,* with guides or bearers, as before mentioned, to prevent too deep an impression. The plate, with the clay coatings, is now turned down upon the cast, and placed under the press. The pressure is gently withdrawn, and the imprinted matrix lifted carefully from the cast or type. (The bearers should have springs, so constructed as to lift the matrix from the type on the withdrawal of the pressure.) This gives a new matrix, in which all the necessary corrections are made, and a new cast taken, as before.

"Stereotyping may be performed by the use of any of the matrices above described, using them when the moisture is sufficiently evaporated to leave a clean impression from a type, as before mentioned. Fine engravings, or anything of that nature, may be more beautifully stereotyped by the use of a matrix of pure soft clay mortar, spread thinly upon a flat surface of dry clay. Press the engraving into it, and allow it to remain until the whole is sufficiently dried to lift the original from the matrix.

"Coats, or types, for printing *fac-similes* of leaves, or other substances, the different parts of whose surface do not vary in height more than the twelfth of an inch, may be readily made by using those substances themselves to impress their form, either in the clay matrix or in a flat surface of the silicate previously prepared to be used as a type.

"The blanks between paragraphs of written or printed matter, whether in the original or in the stereotyped matrices, should be filled up with the mixture of about six parts of fine sand to one of clay, which should be applied about the thickness of cream. The margins may be filled with the same mixture, in the form of mortar, and may be applied with a knife or spatula."

LIST OF REGISTRATIONS EFFECTED UNDER THE ACT FOR PROTECTING NEW AND ORIGINAL DESIGNS FOR ARTICLES OF UTILITY.

1847.

Aug. 2. *T. C. Clarke & Co.*, of Wolverhampton, iron-founders, for a secret axle-pulley.

3. *William Tilke*, of Holborn, manager of the Holborn Baths, for the National Economic Bath.

3. *Edward Williams*, of 13, Heneage-street, Brick-lane, Spitalfields, for the Victoria Septibus.

4. *Edward Nicholson*, of Holdforth House, Bishop Auckland, county of Durham, for a stock for a jumper-drill.

4. *Edward Nicholson*, of Holdforth House, Bishop Auckland, county of Durham, for a jumper-drill.

4. *James Clark*, of 3, Wellington-street, Blackfriars-road, for a hat-suspender.

Aug. 4. *W. Grounsell*, of Louth, machine-maker, for an improved winnowing-machine.

4. *James Basire, jun.*, of Red Lion-square, London, engraver, for an improved blade-protracter.

6. *John Parsons*, of Nottingham, brace-maker, for the Albert brace.

7. *Simister & Holland*, of 66, Cheapside, London, for the ladies' petticoat or dress-dilator.

7. *Simister & Holland*, of 66, Cheapside, London, for the dilator.

7. *The Crane Foundry Company*, of Wolverhampton, for a sash pulley-box or frame.

11. *Charles John Rowlands*, of Birkenhead, Cheshire, shirt collar-maker, for the band of shirt-collars.

13. *Joseph Salt*, of Uxbridge Common, Middlesex, for an improved expanding die for making drain-tiles, conduits, tubes, chimney-pots, and other articles moulded in clay.

14. *John Talbot Ashenhurst*, of 41, Upper John-street, Fitzroy-square, for an improved folding musical and reading-desk or easel.

17. *S. Mordan & Co.*, of 22, City-road, Finsbury, for a spiral spring inkstand-top.

18. *Richard Frederick Bickerton*, of 22, Castle-street, Southwark, for a ventilator for hats, &c.

19. *Turner & Pegg*, of Leicester, for a rectangular woven elastic band.

19. *Edward Gadsby*, of Noble-street, Cheapside, for an improved buckle for braces and other purposes.

20. *James Comins*, of King-street, South Molton, Devon, whitesmith, for an improved one-way turn-over or turn-rest plough,—also a hoeing, earthing-up, or potatoe plough.

21. *Henry Summersgill*, of 24, Nile-street, Church-street, Preston, watch-maker, for an improved going-barrel or main-spring box for watches.

21. *Brown, Marshall, & Co.*, of Birmingham, for an improved spring-roller for glass frames, to be applied to railway and other carriages.

21. *William Wharton*, of Railway Station, Euston-square, for a continuous band.

23. *Charles Dowse*, of Camden-town, for a memorandum book.

24. *John Duffell*, of Birmingham, for a steel-mill.

24. *Lawson & Holden*, of Birmingham, for a railway roof-lamp.

Aug. 26. *François Teychenne, James Waterman, & Phillip Powell,* of Cripplegate, feather merchants, for a pillow or cushion.

27. *George Curling Hope,* of Ramsgate, for a tambour and crotchet needle.

27. *George Curling Hope,* of Ramsgate, for knitting and crotchet cotton.

27. *John Paterson,* of 104, Wood-street, Cheapside, London, for a belt fastening.

List of Patents

That have passed the Great Seal of IRELAND, from the 17th July to the 17th August, 1847, inclusive.

To Thomas Waterhouse, of Edgeley, in the borough of Stockport, in the county of Chester, cotton manufacturer, for certain mechanical improvements applicable to railway engines and tenders, and to railway carriages of various kinds.—Sealed 21st July.

Frederick Theodore Philippi, of Bellfield Hall, in the county of Lancaster, calico printer, for certain improvements in machinery or apparatus for stretching, drying, and finishing woven fabrics.—Sealed 24th July.

Henry Mapple, William Brown, and James Lodge Mapple, of Child's Hill, in the parish of Hendon, in the county of Middlesex, machinists, for improvements in communicating intelligence by means of electricity, and in apparatus relating thereto; part of which improvements are also applicable to other like purposes.—Sealed 26th July.

James Roose, of Darleston, in the county of Stafford, tube manufacturer, for improvements in the manufacture of welded iron tubes. Sealed 26th July.

Onesiphore Pecqueur, of Paris, in the kingdom of France, engineer, for improvements in forming leather into tubes, swithes, cases, sheaths, hats, and other articles.—Sealed 26th July.

Richard Albert Tilghman, of Scott's Yard, Bush-lane, in the city of London, and of the United States of America, chemist, for improvements in the manufacture of certain acids, alkalies, and alkaline salts.—Sealed 2nd August.

Richard Albert Tilghman, of Scott's Yard, Bush-lane, in the city of London, and of the United States of America, chemist, for improvements in the manufacture of certain alkaline salts.—Sealed 2nd August.

Egbert Hedge, residing at No. 7, Howard-street, in the parish of Saint Clement's Danes, and county of Middlesex, Gent., for certain improvements in rails for railways, and in the manner of securing them.—Sealed 2nd August.

Charles Hancock, of Brompton, in the county of Middlesex, Gent., for improvements in the preparation of gutta percha and in the application thereof alone and in combination with other materials to manufacturing purposes; which improvements are also applicable to other substances.—Sealed 10th August.

Henry John Nicoll, of No. 114, Regent-street, in the county of Middlesex, tailor, for improvements in garments, and in pockets, bags, and other receptacles.—Sealed 11th August.

Henry Wrigg, of Upper Holloway, in the county of Middlesex, civil engineer, for certain improved means or methods of diminishing draught and friction in carriages and other conveyances.—Sealed 11th August.

Solomon Leatham, of Leeds, in the county of York, overlooker, for improvements in roving and spinning flax and other fibres. Sealed 14th August.

List of Patents

Granted for SCOTLAND, subsequent to July 22nd, 1847.

To John Yule, of Sauchiehall-street, Glasgow, for certain improvements in chairs used on railways, and in the fixing of the same.—Sealed 27th July.

Henry Mapple, William Brown, and James Lodge Mapple, of Child's Hill, in the parish of Hendon, for improvements in communicating intelligence by means of electricity, and in apparatus relating thereto; part of which improvements are also applicable to other purposes.—Sealed 2nd August.

Moses Poole, of the Bill Office, London, for improvements in the manufacture of cast metal, iron, and steel,—being a foreign communication.—Sealed 5th August.

Robert Stirling Newall, of Gateshead, for certain improvements in locomotive engines.—Seald 6th August.

John Mackintosh, of Bedford-square, London, for improvements in engines to be worked by steam or other suitable fluid; and improvements in propelling carriages and vessels.—Sealed 6th August.

William Thomas, of 129, Cheapside, London, merchant, for certain improvements in stays; which improvements are applicable to other useful purposes,—being a foreign communication.—Sealed 11th August.

Pierre Armand le Comte de Fontainemoreau, of 4, South-street, Finsbury, London, for certain improvements in the machinery for cutting wood, and in laying and uniting veneers,—being a foreign communication.—Sealed 11th August.

James Webster, of Sneinton, in the county of Nottingham, for an improved atmospheric buffer, to be applied to railway carriages and other vehicles travelling on railways.—Sealed 12th August.

John Thompson Carter, of Drogheda, Ireland, flax-spinner, for improvements in machinery for crushing, bruising, and preparing flax, hemp, and other fibrous materials requiring such treatment.—Sealed 16th August.

Frederick Steiner, of Hyndburn Cottage, near Accrington, in the county of Lancaster, Turkey-red dyer, for improvements in the manufacture of sugar,—being a foreign communication.—Sealed 16th August.

Thomas Birchall, of Ribbleton Hall, in the county of Lancaster, for improvements in folding newspapers and other papers.—Sealed 16th August.

James Morison, of Paisley, shawl manufacturer, for improvements in applying power in propelling or moving carriages, and in giving motion to machinery.—Sealed 18th August.

Philip Henry Holland, of Chorlton-upon-Medlock, Manchester, surgeon, for improvements in applying manure to land,—being a foreign communication.—Sealed 20th August.

New Patents

SEALED IN ENGLAND.

1847.

To **Theodore Fletcher**, of Birmingham, brass-founder, for an improved manufacture of speculums for various purposes. Sealed 3rd August—6 months for inrolment.

John Yule, of Sanchiehall-street, Glasgow, practical engineer, for improvements in chairs used on railways, and in the fixing of the same. Sealed 3rd August—6 months for inrolment.

Arthur Boyle, of Birmingham, umbrella-frame maker, for improvements in the manufacture of buttons. Sealed 4th August—6 months for inrolment.

Joseph Bourne, of Derby Pottery, Derby, for improvements in the construction of kilns for burning stone-ware and brown-ware. Sealed 4th August—6 months for inrolment.

Thomas Birchall, of Ribbleton Hall, in the county of Lancaster, Gent., for improvements in folding newspapers and other papers. Sealed 5th August—6 months for inrolment.

William Broadbent, of Manchester, paper manufacturer, for improvements in the manufacture of paper. Sealed 5th August—6 months for inrolment.

James Simister, of Birmingham, manufacturer, for improvements in the manufacture of stays and belts. Sealed 5th August—6 months for inrolment.

Benjamin Bailey, of Leicester, machine maker, for improvements in manufacturing knitted fabrics. Sealed 6th August—6 months for inrolment.

Edward William Eton, of New Windsor, Berks, Bachelor of Medicine, for certain improved machinery for preventing accidents on railways. Sealed 19th August—6 months for inrolment.

Osborne Reynolds, of Dedham, Essex, Clerk, for improvements in making hop-poles, hurdles, fencing, ropes, basket or wicket work, and other similar articles. Sealed 19th August—6 months for inrolment.

William Bacon, of Bury, Lancashire, engineer, and Thomas Dixon, of the same place, engineer, for certain improvements in steam-engines. Sealed 19th August—6 months for inrolment.

William Eaton, of Camberwell, Surrey, engineer, for certain improvements in raising water and other liquids from one level to another. Sealed 19th August—6 months for inrolment.

Orlando Brothers, of Blackburn, Lancashire, engineer, for certain improvements in the method of manufacturing retorts, and in the machinery or apparatus connected therewith. Sealed 19th August—6 months for inrolment.

Archibald Farries, of Preston, in the county of Lancaster, Gent., for improvements in propelling carriages on common roads. Sealed 19th August—6 months for inrolment.

François Augustus Renard, of 40, Rue du Rocher, Paris, for improvements in preserving and coloring wood. Sealed 19th August—6 months for inrolment.

James Webster, of Sneinton, in the county of Nottingham, engineer, for an atmospheric buffer, to be applied to carriages and other vehicles travelling on railways. Sealed 19th August —6 months for inrolment.

Aimé Boura, of Rathbone-place, Middlesex, dyer and scourer, for improvements in extracting coloring matters. Sealed 19th August—6 months for inrolment.

Alexander Speid Livingstone, of No. 7, Bridge-place, Lewisham, Kent, civil engineer, for certain improvements in the construction of locomotive engines intended to be used on railways. Sealed 23rd August—6 months for inrolment.

Thomas Danson Pruday, of the Freemasons' Tavern, Great Queen-street, Middlesex, cook, for certain improvements in apparatus for reducing vegetable and other substances to small particles. Sealed 26th August—6 months for inrolment.

Disclaimer and Amendment

OF PART OF AN INVENTION

MADE UNDER LORD BROUGHAM'S ACT.

Disclaimer and memorandum of alteration allowed on the 22nd of June, 1847 (filed on the 2nd of July, 1847), to the specification of a patent granted to John Frederick Bourne, of Manchester, engineer, and John Bartley, jun., of the same place, engineer, for certain improvements in the construction of wheels to be used on railways and other roads, and which improvements are also applicable to the construction of wheels in general, dated 6th September, 1838,—assigned to Henry Smith and Thomas Willy, both of Liverpool, engineers.

CELESTIAL PHENOMENA FOR SEPTEMBER, 1847.

D.	H.	M.	
1			Clock after the ⊙ 0m. 0s.
			☽ rises 10h. 22m.
			☽ passes mer. 5h. 14m.
			☽ sets 0h. 58m.
—			Juno stationary
	9	14	☽ in □ or last quarter
2	3	53	♄ in oppo. to the ⊙
—			Occul. *N* Tauri, im. 12h. 42m. em. 13h. 38m.
4	3	38	♃ in conj. with the ☽ diff. of dec. 5. 10. N.
	12	47	♃'s first sat. will im.
			Occul. *k* Geminorum, im. 12h. 17m. em. 13h. 8m.
5			Clock after the ⊙ 1m. 17s.
—			☽ rises 1h. 2m. M.
—			☽ passes mer. 8h. 45m. A.
—			☽ sets 4h. 20m. A.
8	9	34	☿ in conj. with the ☽ diff. of dec. 4. 55. N.
9	3	47	Ecliptic conj. or ● new moon
	13	56	♃'s second sat. will im.
10			Clock after the ⊙ 2m. 57s.
—			☽ rises 6h. 15m. M.
—			☽ passes mer. 0h. 30m. A.
—			☽ sets 6h. 35m. A.
	13	25	♀ stationary
10	23	25	☿ greatest hel. lat. N.
11	1		☽ in Apogee
11	13	6	♀ in conj. with the ☽ diff. of dec. 8. 9. S.
	14	40	♃'s first sat. will im.
14			Mercury R. A. 11h. 11m. dec. 7. 8. N.
—			Venus R. A. 12h. 53m. dec. 13. 45. S.
—			Mars R. A. 2h. 52m. dec. 13. 24. N.
—			Vesta R. A. 14h. 48m. dec. 12. 26. S.
—			Juno R. A. 18h. 38m. dec. 10. 46. S.
—			Pallas R. A. 8h. 15m. dec. 6. 28. S.
—			Ceres R. A. 9h. 32m. dec. 20. 46. N.
—			Jupiter R. A. 7h. 9m. dec. 22. 26. N.
14	—		Saturn R. A. 22h. 44m. dec. 10. 14. S.
—			Georg. R. A. 1h. 4m. dec. 6. 9. N.
—			Mercury passes mer. 23h. 43m.
—			Venus passes mer. 1h. 21m.
—			Mars passes mer. 9h. 26m.
—			Jupiter passes mer. 19h. 33m.
—			Saturn passes mer. 11h. 10m.
—			Georg. passes mer. 13h. 31m.
15			Clock after the ⊙ 4m. 41s.
—			☽ rises 11h. 24m. M.
—			☽ passes mer. 4h. 9m. A.
—			☽ sets 8h. 50m. A.
16	11	25	♃'s third sat. will em.
16	16	32	♃' second sat. will im.
17	7	21	☽ in □ or first quarter
17	17	38	♀ greatest hel. lat. S.
18	16	34	♃'s first sat. will im.
19	14	36	☿ in sup. conj. with the ⊙
20			Clock after the sun 6m. 27s.
—			☽ rises 3h. 40m. A.
—			☽ passes mer. 8h. 30m. A.
—			☽ sets 0h. 14m. M.
22	17	11	♄ in conj. with the ☽ diff. of dec. 5. 3. S.
23	4	22	⊙ enters Libra,—Autumn commences
24	2	25	Ecliptic oppo. or ○ full moon
	9		☽ in Perigee
24	10	43	♂ stationary
25			Clock after the ⊙ 8m. 11s.
—			☽ rises 6h. 24m. A.
—			☽ passes mer. 0h. 13m. M.
—			☽ sets 6h. 46m. M.
25	3	8	♅ in conj. with the ☽ diff. of dec. 0. 2. S.
26	23	20	☿ in conj. with ♀ diff. of dec. 10. 2. N.
27	1	18	♂ in conj. with the ☽ diff. of dec. 0. 25. N.
27	12	55	♃'s first sat. will im.
28			Occul. 75 Tauri, im. 10h. 29m. em. 11h. 8m.
29			Occul. 111 Tauri, im. 9h. 35m. em. 10h. 27m.
30			Vesta in Perihelion

J. LEWTHWAITE, Rotherhithe.

THE

LONDON JOURNAL,

AND

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OF

Arts, Sciences, and Manufactures.

CONJOINED SERIES.

No. CXC.

RECENT PATENTS.

To GEORGE BEADON, *of Taunton, in the county of Somerset, Commander in the Royal Navy, and* ANDREW SMITH, *of Princes-street, Leicester-square, in the county of Middlesex, engineer, for improvements in warping or hauling vessels; which improvements are also applicable to moving other bodies.*—[Sealed 21st January, 1847.]

THIS invention consists in improved mechanism for warping or hauling boats or vessels along canals or rivers; and also in hauling carriages on railways or tramways, by means of ropes, chains, or bands; the same construction of mechanism, with slight modifications, being employed for propulsion on both land and water.

In Plate VII., fig. 1, represents a longitudinal section of a canal-boat, with one arrangement of the improved machinery applied thereto. The particular novel parts are represented detached on a large scale in the auxiliary figures 2, 3, and 4. A, is an ordinary boiler of a steam-engine; B, B, are two reciprocating steam-cylinders, the pistons of which act upon a horizontal crank-shaft C. Upon this shaft a whelp-wheel *a*, is fixed, having six arms, through which long slots are cut, for the purpose of receiving six adjustable sliding arms or whelps *c, c, c*. These adjustable arms or whelps are to be all placed at equal distances from the central axle or shaft of the whelp-wheel; and, when made fast in their places, form a reel to receive a coil of galvanized wire-rope or chain *d, d*. This galvanized rope or chain *d, d*, which is the warping-line, is secured at each end to some stationary holdfasts upon the land, or in the water by anchors or moorings, at a considerable distance apart. The whelps *c, c, c*, are made concave on their bearing surface, to prevent the rope or chain surging or slipping off; and they are enabled to be slidden in the slots of the arms, and fixed at any distance from the centre of the wheel by means of keys or wedges, which, when driven home, as shewn in the plan view fig. 3, will bring their shoulder tight against the arm of the wheel: the object of sliding these whelps is to increase or diminish the diameter of the reel, according to the speed the vessel is required to run. *e, e*, are horizontal-rollers, mounted in cast-iron standards D, D, fore and aft of the warping-wheel *a*, and are for the double purpose of guiding the warping-rope, and keeping it tight on the reel. *f, f*, are vertical guide-rollers, mounted in brackets projecting from the standards D, D. On the axle of each of the lower rollers *e, e*, a bevil-wheel *g*, is mounted; and into these wheels, bevil-wheels, mounted on a horizontal-shaft *h*, gear, as shewn at fig. 3. The pair of bevil-wheels at the forward end of the shaft *h*, is intended to be of a less speed than the aft pair of bevil-wheels, for the object to be presently explained. When the engine is set to work, it will, through the crank-shaft C, communicate rotary motion to the warp-wheel *a*; and a coil of the warping-chain or rope being laid round the whelps *c*, the rotation of that wheel will carry the vessel forward. The friction of the warping-rope on the rollers *e, e*, as the vessel moves on in its course, will cause the rollers to revolve; and as the upper rollers *e*, by their weight, press or nip the rope against their under rollers, and the speed of the front rollers is less than the aft pair of rollers, the latter will have a tendency to take up the rope quicker than it is given off from the reel; and thus keep it thereon in tension. In order to allow one vessel to pass another on a single line of warping-chain or rope, it will be necessary to throw one vessel out of connection, temporarily, with the warping-chain. For this purpose, the rollers *e*, *e*, are mounted as shewn at figs. 2, and 4, whereby the top ones may be readily lifted from their bearings. This will admit of the warping-chain being thrown off from the rollers *e*; and it may be withdrawn from between the vertical-rollers *f*, a free way being left at top between the brackets, which carry these rollers, for the passage of the chain. H, is the steering apparatus, placed at both ends of the vessel.

At figs. 5, another method is shewn of getting a hold upon the warping-chain or rope, instead of employing the whelps. A, is a roller, mounted in a suitable framing; and above it are two other rollers B, B, mounted also in the same framing. Between these rollers a warping-line, composed of wire-rope or hoop-iron is introduced; and the upper rollers are pressed down by screws, springs, or otherwise, and made to nip the chain sufficiently to prevent its slipping when the lower roller (which in this case performs the part of the warping-wheel) is caused to rotate by the steam-engine or other motive power in the vessel.

The patentees shew the novel construction of whelp-wheel applied to a railway, for hauling trains up inclines; but it will be unnecessary to state more than that the whelp-wheel is placed in front of the locomotive-engine; and its crank-shaft is turned by means of the connecting-rod of the engine.

Another mode of hauling or warping vessels into and out of harbours and upon inland waters is shewn at figs. 6, and 7; fig. 6, being a plan view of a vessel with the apparatus applied thereto, and fig. 7, a vertical section of the same. This part of the invention has reference to a method of nipping or holding the warping-chain or rope by steam pressure. The hauling or warping apparatus consists of a central-wheel A, keyed to a shaft B, placed across the vessel, and turning in bearings in a strong wooden or cast-iron framework C, C. In a line with this wheel A, but fore and aft thereof, is a guiding-pulley D, D. These pulleys D, and also the wheel A, (which may be termed the warping-wheel), are provided at their peripheries with pins, which are set in their respective flanges, and thus produce a light wheel. Attached to the centre wheel A, are three, or any other convenient number of steam-cylinders E, set at equal distances apart, and provided with pistons and piston-rods, as shewn. These cylinders are at given periods supplied with steam from a boiler, which steam passes up a hollow made in the shaft B, and enters the several pipes F, which lead to their respective cylinders. Between that end of the cylinders next the wheel A, and their several pistons, a strong spring *a*, is coiled round the piston-rod, which carries at its outer end a buffer or plunger *b*. In that flange of the wheel A, next to the cylinders, openings are made, to allow of the buffers or plungers *b*, passing through and coming against the inner face of the other flange. The valves for admitting steam to the cylinders and cutting off the supply are worked (as will be readily understood on inspecting the drawings) by rods G, connected to the strap H, of a fixed excentric, which surrounds the shaft B. I, is a cog-wheel, mounted on the crank-shaft K, which turns in suitable bearings, and receives its motion direct from the steam-engine or other first mover; this wheel I, gears into a wheel L, mounted on the shaft B, and thus gives motion to the warping-wheel A. M, M, is the warping-chain or rope, laid along the channel, and secured at its extremities, and at its other parts, where sinuosities or other circumstances may require it to be "guyed." N, N, are pulleys or "fair leaders," for guiding the rope or chain M. It will now be understood, that the rope being laid under the guiding-pulleys D, and over the wheel A, it will only be necessary, when the shaft B, and its wheel are actuated by the motive power, to make the rope M, adhere to that wheel, in order to propel the vessel forward. This operation is effected as follows:—Steam is admitted from the boiler into, say, the cylinder E*, in front of its piston, whereby the piston will be forced forwards, carrying with it the buffer *b*, on its end. This buffer, on passing through the opening in the flange of the wheel A, will come in contact with the rope or chain M, and press it tightly against the opposite flange.

The rope being thus griped, and being in itself stationary, the effect will be, that the wheel A, as it revolves, will move the vessel forward about one-third the length of its periphery (when three pressers are used), or the distance between one presser and the next adjoining one. When the vessel has progressed thus far, the exsentric H, will cut off the steam from the cylinder B*, and let it on to the next following cylinder, whereby, in like manner, the rope or warping-chain will be griped; and thus a continuous forward motion will be imparted to the vessel.

As soon as the pressure of the steam is withdrawn from the front of the piston, the spring *a*, before mentioned, will return it to its original position; or steam let on to the other side of the piston will release the warp-chain from the pressure of the buffer or presser *b*. In order to allow of one vessel passing another in an opposite direction, on a single line of warping, it is necessary to throw one vessel out of connection with the warping-chain. This is effected by heaving up the guiding-pulleys D, (the axles of which are, for this purpose, mounted in hinged-bearings) and slipping off the chain from the periphery of the wheel A. O, is a ring attached by a chain or rope to a buoy of sufficient displacement to support its weight in the water, and to float or "watch" on the surface. It should be observed, that the warping-chain must be led through this ring before it is passed over the warping-wheel; and that the buoy-rope must be of sufficient length to reach from the surface of the water to the warp as it lies on the ground; the object being, that when two vessels meet, and it becomes necessary to disengage the warp from one warping-wheel, to enable them to pass each other, the workmen will be enabled to weigh the chain or warp again with celerity. Each warping boat is to be provided with a buoy and ring; and when two boats meet, each will take the other's buoy in exchange. The ring is made of sufficient diameter to allow the chain or warp to pass freely, as it is hove in. In some cases an eye or loop is necessary to be attached to the buoy-ring on its upper side, so that it may be readily hooked or passed over a post or pile, where curves require the warp-chain to be guyed.

P, P, is a steering apparatus, moving upon a fixed centre Q, and having a semicircular toothed sector R, at one end, in gear with a worm or spiral S, on a shaft T, turning in suitable bearings in the framing, and provided at each end with steering-wheels U, U.—W, W, are guiding-pulleys, over and between which the warp can be led. By turning the wheels U, the sector-rack is moved either to the right or left, as desired; and the other extremity of the apparatus moves in a contrary direction, and guys the warp-chain to the one side or the other; thus facilitating the steering of the boat in the required direction.

In the drawings, accompanying the specification, several modifications of the invention of binding the warp-chain or rope to the wheel A, are shewn. Fig. 8, is an edge view, partly in section, of one mode of effecting this end. *a, a*, are two vibrating levers, working on centres *b*, and connected at their outer ends with sliding-rods *c*, which pass through the flanges of the wheel A, and respectively enter a box *f*, attached to the other side of the wheel. In each of these boxes is a coiled spring, which, being connected to the rod *c*, has a tendency to draw it into its box. Each rod *c*, is also provided with a hook, for the purpose of laying hold of the warp-chain. The inner ends of the levers *a*, or those nearest the axle of the wheel A, are pressed inwards by a rotatory cam *d*, fixed on the shaft of the wheel A. This cam acts upon a sliding-piece *e*, with which the levers *a*, are provided; it is composed of a frame, somewhat in the shape of the letter H; the outer ends of which frame carry an antifriction roller, in contact with the cam, and the inner ends slide in holes made in the lever. A coiled spring *k*, (see the detached view, fig. 9,) is inserted between the lever and the centre or cross-bar of the frame, whereby an elastic pressure is transmitted to the lever when the excentric portion of the cam comes into action. This pressure may be nicely adjusted by means of a screw and nut, which will compress the spring as required. By referring to the drawing it will be seen, that when the inner end of the lever *a*, is forced inwards, the other end will draw forward the sliding-rod *c*, the hook of which will catch hold of the warp-chain, and hold it tight against the warp-wheel A.

Another mode of griping the warp-chain is shewn in edge view at fig. 10. A, A, is a wheel, similar to those before described, mounted in a framing, and secured to the carriage or boat to be warped, and driven by steam, hand-gear, or other motive power; *b*, *b*, is an excentric cam, fixed to the framing, and allowing the shaft of the wheel A, which passes through it, to revolve freely; *c*, is a saddle-piece, secured to one side of the wheel A, and having a pulley *d*, mounted on its outer part; *e*, is another pulley, having its bearings in the saddle-piece, and capable of sliding in a slot formed therein; *f*, is a wedge on the outer end of the rod *g*, *g*, which is actuated by being connected to the strap of the excentric cam; *h*, is the nipping-bolt or buffer, made with a fork with holes or eyes, through which the axle of the moveable pulley *e*, is passed; *i*, is a box, attached to the opposite side of the wheel A, and having a spiral spring bearing against it and the nipping-bolt, to force the nipping-bolt back when required to quit the warping-chain. When the rod *g*, is acted on by the larger radius of the excentric cam, the wedge *f*, will be forced between the pulleys *d*, and *e*; the latter of which will be thrust forward, and cause the nipping-bolt to draw the warping-chain tightly against the flange of the wheel A.—*k*, is the coiled spring, with its screw and nut, for adding to the force necessary to nip the warp-chain, as described in the preceding method. It may here be remarked, that the buffer or nipping-bolt must be pressed by an elastic medium of some kind; as in the event of any obstruction being hove in with the warp-chain, the machine would be stopped, unless constructed to admit of the nipper yielding to any increased bulk which may be laid hold of.

A further modification of the apparatus for nipping the warp-chain to the warp-wheel is shewn at figs. 11, and 12; fig. 11, being an elevation, partly in section, and fig. 12, a plan view of the same. A, A, represent the warping-wheel, mounted on a framing *b*, *b*, and revolving in suitable bearings, *c*; *d*, are air-cylinders, open at both ends, and fixed to the periphery of another wheel *e*; *f*, is an excentric cam, affixed to the framing, and having an excentric groove *g*, *g*, cut in it; *h*, are pistons, working in the cylinders *d*, and attached respectively by a rod *i*, to friction-wheels *k*, rolling in the groove *g*, *g*. When the wheel A, is driven round by a pinion, worked by power, and in gear with the cogged-wheel *l*, (which is keyed on to the shaft of the warping-wheel A, A, and affixed by bolts *m*, *m*, to the wheels A, and *e*,) the pistons *h*, are alternately drawn out and pushed in. *n*, *n*, are other and similar pistons, working in the same cylinders, and connected to the wedges *o*, *o*, *o*. When the piston *h*, is drawn down, by the roller *k*, passing through the excentric part of the groove, a vacuum is formed between the two pistons *h*, and *n*; the piston *n*, will therefore be forced after the piston *h*, by the atmosphere pressing on its outer end, whereby the wedge *o*, will be drawn between the rollers *q*, and force the one next the wheel forwards. This movement will cause the nipping-bolt *p*, *p*, which is attached to the axle of the sliding-roller, to force the warp-chain against the opposite side of the wheel A, and keep it firmly held during the period the roller *k*, is in the concentric portion of the groove, by a pressure proportionate to the vacuum caused by the separation of the two air-tight pistons *h*, and *n*. When the roller *k*, has passed along the groove, and comes in contact with the concentric outside surface * * of the cam *f*, the pistons *h*, and *n*, and wedge *o*, are pushed back in the contrary direction. The spiral spring in the boxes *s*, *s*, on the other side of the wheel A, then comes into action, and forcing the bolt *p*, back, releases the warping-chain, and thus each nipping-rod or bolt or buffer is forced against the chain in succession; and each nipping-rod is caused to release its hold in succession, as the wheel A, revolves.

Fig. 13, represents, in elevation, an arrangement of warping apparatus which is intended for a tug-boat. A, is the boat; B, B, are two nipping or warping-wheels, of either of the constructions previously described; C, C, are fair leaders or guiding-pulleys, for conducting the warp-chain or rope D, D, over the wheels B;—E, E, are cog-wheels, keyed respectively to the shafts of the wheels B, B, and revolving therewith. Between these cog-wheels is a pinion F, in gear with the wheels E. The machinery is caused to revolve by the action of an oscillating-cylinder engine G, which gives motion to the shaft of the pinion F, and thus through the cog-wheels B, to the warping-wheels B. H, is an inclined bevilled roof, which covers the boat, allowing only the upper part of the warping wheels to appear above; by this means a shield is provided for the steersman, who can guide the boat (an opening I, being made in the roof to allow of his looking a-head) without being liable to be swept overboard by the warping-chain, which chain is free to slide over either side of the boat, and may be unshipped from the warping-wheels without lifting any guiding-pulleys, as was the case in the former arrangements. It will be readily understood, that if the wheels B, revolve simultaneously, and alternately grip the warp-chain, that chain will not be able to slip, although no pulleys are employed, as in the before-described arrangement, for keeping it in contact with a considerable portion of the periphery of the warp-wheels.

Fig. 14, represents the manner in which the transfer of tug-boats and barges from one level of canal to another level is intended to be effected. A, represents the water-line of the lower level of the canal, and B, the water-line of the higher level. Between the two levels of the canal a bank C, is thrown up, which may be cased with brick, if thought desirable. From the bottom of the lower portion of the canal to the bottom of the upper portion an inclined railway is made: D, is a carriage, furnished with small wheels to run on the railway, and intended to form a cradle for the tug-boat E. The warping-rope being secured at its ends in any convenient place, it is connected, by either of the plans above described, to the warping-wheel of the tug-boat; and the steam or other motive power being applied to the wheel, the boat, with its cradle, will be hauled on to the higher level. Instead of rails, pulleys may be mounted in suitable bearings in the road; and a cradle without wheels, forming a kind of sledge, may be employed, instead of that shewn in the drawing. When the tug-boat has attained the higher elevation, and has floated into the canal above, it may, by means of a supplementary warping-rope, attached successively to each one of its train of boats or barges, haul them up over the embankment; the warping-wheel of the tug-boat acting, in this case, as an ordinary windlass. The tug-boat, with its hauling machinery, may, if thought necessary, be secured on the verge of the incline by breast-fasts and moorings, leaving space for each boat in succession to be hauled into the upper level of the canal. After each boat of the train is raised, the tug-boat warps a-head and takes the train in tow; when it proceeds, as before, to the next incline.

The patentees claim, First,—the improved construction of expanding reel or whelp-wheel, whether applied to the warping of vessels upon inland or other waters, or upon land for moving engines and carriages upon railways; and also the arrangement of the machinery employed in connection with such whelp-wheel or reel for guiding the warping-rope or chain on to the reel, and making it "taut" upon the whelps thereof: under this head of the invention they claim the modification shewn at figs. 5, whereby the nip is given to the warping-rope, or to hoop-iron, used as a warp, by means of friction-rollers. Secondly,—the general arrangement and particular constructions of warping apparatus for nipping or binding the warping-chain or rope to the warping-wheel by temporary pressure. Thirdly,—the arrangement of the nipping warping-wheels and slanting roof, as shewn at fig. 13, for guiding up the warping-rope or chain to the wheels, and allowing it to slue from side to side, according to the motion of the vessel. And, Fourthly,—the mode of hauling vessels from one level of canal to another level, as above described.—[*Inrolled in the Petty Bag Office, July, 1847.*]

Specification drawn by Messrs. Newton and Son.

To Bartholomew Beniowski, *of Bow-street, Covent-garden, in the county of Middlesex, Gent., for his invention of certain improvements in the apparatus for, and process of, printing.*—[Sealed 17th November, 1846.]

The first part of this invention is designed for the purpose of facilitating the usual operations of the compositor; that is, distributing or arranging the types, blocks, spaces, &c., in cases; and composing the types, &c., from the cases into words, sentences, paragraphs, &c.; and correcting the composed matter after it has been thus brought together.

These advantages are attained by first marking upon the four sides and lower surface of the shank of each type the same letter or character as that which is formed upon the upper surface of the said shank, technically called the face of the type,—with this difference, however, that the letter or figure to be marked upon the sides and lower surface of the shank of the type is not reversed, but has the direct form or appearance of the letter or mark as we read it in print.

In Plate VIII., figs. 1, and 2, represent, in perspective views, one of the improved types. The first of these figures shews the face of the type with the letter a, formed thereon, reversed, as in ordinary printing types; the second of these figures shews the under part of the same type, with the same letter a, upon its under surface. The sides of the type in both figures are seen likewise marked with the same letter in its direct position; so that whatever part of the type presents itself to the compositor, it will be readily recognized. These additional letters on the lower surface and sides of the shanks of the type may be produced by writing, painting, engraving, etching, &c.; but the patentee prefers to write these letters with an ordinary pen and ink or writing fluid of any color; and to prevent them from being obliterated by means to be hereafter described. These additional letters are to be marked on the shank of the types in different colors, so as to make a distinction between capitals, small capitals, and small letters (technically called "lower-case" letters). Each particular fount is to be marked in the nick with a particular sign, at the option of the type-founder. Foreign alphabets (such as Greek, for instance) are marked in like manner with the foreign letter; and they may be also with the corresponding English letter.

The second improvement is for the purpose of preventing the lead and antimony, of which ordinary types are composed, acting injuriously upon the health of the compositor, by coming in contact with the most delicate portions of his body, viz., the organ of touch and the lungs. This is effected by covering the whole of the types, except their faces, with varnish, which answers at the same time the purpose above alluded to, of preventing the obliteration of the letters written or painted with simple color or writing-ink.

The third improvement consists in manufacturing the spaces and quadrats either of iron or of wood, or some of iron and some of wood; the object being to render the spaces cheaper and lighter; and, secondly, to facilitate the operation of separating such spaces and quadrats from the other types or blocks. These spaces and quadrats may be painted of various colors, and are to be varnished to protect them from the action of the water.

The fourth improvement is designed to facilitate both the distribution and composition of types, by arranging considerable numbers of types of one kind in distinct tubes, each belonging to its particular letter or type. This feature consists in an apparatus which the patentee terms the "type-store," formed by a number of vertical tubes, of a square, round, or any other suitable form, about one foot long, as shewn combined at fig. 3;—the lower ends of these tubes are closed. The dimensions of the horizontal or cross sections of each of these tubes must be less than the usual height of types, in order to prevent the types tumbling over in the tubes when they are introduced therein. The respective types are delivered from the hands of the distributor each into its proper tube, the tubes being severally marked on the outside with the letter indicating the "sort" it is to contain.

For the better understanding of this part of the invention the patentee next describes the manipulations relating to "distributing." The page or form of composed types, blocks, and spaces is unlocked, and placed in a flat tray, a few inches deep, and of convenient size; the types are then spread loosely, and caused to lie upon their long surfaces or sides, by pressing with the hand in such a manner that they shall form an even layer upon the tray; care being taken, as far as possible, that none of the types shall be heaped upon one another. A permanent or temporary magnet, of suitable power, is then passed over the whole surface of the types, when all the iron spaces will of course be attracted by, and adhere to, the magnet; and by this means they will be separated from the type, and may be placed in their respective tubes of the type-store, above described. Next, all the logotypes and phraso-types (which will be described hereafter) are picked up out of the tray by hand, and placed upon a board in alphabetical order, in vertical columns; water is then poured into the tray, and the wooden spaces and wooden quadrats, by their buoyancy rising to the surface, may be readily removed; and when dried in the usual manner of drying types, they are placed in their respective tubes of the type-store. The water having been allowed to escape from the tray, the types are severally selected and placed, with their faces upwards, in their respective tubes of the type-store. As they are introduced into their respective tubes, the types slide down and arrange themselves side by side; and as the tube fills, they stand one upon another, but always in the same erect position; for the width of the tube will not admit of their falling over into cross positions.

The fifth improvement consists in an apparatus for the purpose of facilitating composition. This apparatus, which is termed the "authoriton," consists of a number of square tubes, equal to the number of sorts in use (one of which is shewn in fig. 4,); the length of each tube is about one foot and a half, and in height and width about half an inch (a little smaller than the usual length, technically called "height," of types). The end of the tube marked with *, fig. 4, is to be turned towards the compositor: both ends are open. At the end *, a portion of the upper side of the tube must be removed for the distance of about half an inch, but this removed portion of the tube must be always shorter than the usual height of types. At the other end of the tube a portion of the upper side is also removed, to the extent of about one inch and a half. A suitable number of these tubes is arranged and combined as shewn at figs. 5, and 6. These tubes are severally to be marked with a letter, indicating the letter each tube is to contain. Fig. 5, is an elevation, and fig. 6, a horizontal view of the tubes, connected together by cramps.

Each of these tubes is filled with a suitable number of its respective types, with their faces towards the compositor.

This is accomplished by taking a corresponding tube from the type-store, and holding it in an inclined direction towards the horizon, with its open end close over the back part of the tube of the authoriton. The types will thereby naturally lodge themselves in this receiving tube, with their faces all in the same direction. Having thus transferred a suitable number of types, the compositor is to place in the back part of each tube of the authoriton a parallelopiped of wood, about three inches long (see fig. 7,), the cross section of which is a trifle smaller than the cross section of the interior of the tubes, so that this parallelopiped may be easily pushed forwards along the interior of the tube.

This piece, which is called the "pusher," serves the purpose of driving the types forward until their faces reach exactly the front end of the tube. When the types visible at this portion of the tube are exhausted by composition, a new supply is forwarded by pressing on the pusher. The required types (as indicated by the copy) are picked up by means of suitable tweezers, of about the shape and dimensions shewn at fig. 8, and placed consecutively in the compartments of the "copying-stick," which is placed on the table close to the authoriton.

Fig. 9, is a horizontal view of the copying-stick; and fig. 10, is a front elevation of the same. The length of the copying-stick is about ten inches; the width is equal to the usual length, technically called the height of the types. There is a vertical ledge round three sides of the bottom of this copying-stick, leaving the front open; its height is equal to about two "*m*-quadrats" of the kind of types in which it is being set up. There are a series of vertical partitions, made of some pliant and elastic substance, as sheet India-rubber, inserted into the bottom of the copying-stick; their height above the bottom is about one-tenth of an inch, and their length from the back is about half an inch. They are fixed in suitable grooves, cut in the bottom of the copying-stick; but the other three margins of these partitions are free, so that they will easily yield or incline either to the right or left. The width or spaces between these compartments, thus formed, are equal to about an *m*-quadrat, except the last, at the right end, which is about an inch. In placing the types in this copying-stick, it is indifferent as to which of their sides comes uppermost as they fall from the tweezers, provided they lie with their faces to the compositor. At the end of each word no spaces are placed, but one or more of the compartments are left empty; wherever double letters occur the two double letters are picked up together, and placed both in the same compartment; wherever logo-types and phraso-types occur, they are laid upon the elastic partitions; as they will naturally cover several compartments; and so the composition is continued to the end of the stick. In the large right-hand compartment nothing is put, but it is merely for the purpose of allowing room in case of a logo-type or phraso-type ending the stick. One stick is thus filled after another, and they are so placed that the back of one stick touches the face of the types in the adjoining stick behind it. Fig. 13, shews two sticks-full of the composition of types. Having filled a suitable number of these sticks, and read them over, the compositor hands them to a justifying boy, who puts one type after another into the usual composing-stick, and exactly in the usual manner, viz., with the feet touching the bottom of the composing stick, and the nicks upwards; and he places spaces whenever he meets with an empty compartment of the copying-stick, which spaces are placed before him in a few ordinary boxes. The further operations of carrying over the composed matter to the galley, the chase, &c., until the "locking-up," inclusively, is performed in the ordinary manner.

In order to make the corrections, the locked-up form is turned upside down,—suitable pieces of wood being placed under the sides of the chase. It will be understood, that the operation of correcting will be greatly facilitated by the letters marked on the lower surfaces of the types, which can be read as easily as a printed page. The drawing out of the types is also performed more easily than in the usual manner, on account of handling the bodkin more boldly; as any accidental scratching of the lower surfaces of the type will be of little consequence.

The sixth improvement is termed "poly-composing;" for by it two, three, or more compositions of the same copy are made with greater expedition and less expense than could be done in the usual manner. This is effected by proceeding as above described, for the production of a single composition, with this difference,—that to the copying-stick two, three, or more types, of the same character, are transferred from the authoriton at the same time. For instance, if two, three, or more compositions of the word LONDON are required, two, three, or more L's are taken at once from the authoriton and placed in one compartment of the copying-stick; and the same is done with the same number of O's, N's, D's, O's, and N's. The sticks thus filled pass successively from one justifying-boy to another, each being instructed to take only one of the two, three, or more letters lying in the same compartment, leaving the remaining types to be operated upon by his next neighbour.

The seventh improvement is for the purpose of further facilitating the processes of composition and distribution. This is effected by means of "logo-types" and "phraso-types." By logo-types is meant a number of letters united together; by phraso-types, a number of words united together is to be understood. Notwithstanding their great utility in saving the time of the compositor and distributor, they have never been introduced to any considerable extent, and are at present rejected, for the following reasons: viz., 1st. The difficulty and expense of casting. 2nd. When one letter is spoilt the whole must be re-cast. 3rd. The superficies of the ordinary "cases" are already too great; and with the addition of a number of logo-types and phraso-types they would be obliged to be made so large as to be extremely inconvenient. And, 4th. The justifying of the lines of type ending with a logo-type, or phraso-type, would be next to impossible. These difficulties, the patentee states, he has overcome by the following improvement:—He forms logo-types and phraso-types, not by casting, but by uniting the types of which they consist by gum, glue, paste, cement, or other similar substance; by twisting round them fine thread, cotton, silk, fine metallic wires, or other filaments; by surrounding them with fine tapes, ribbons, slips of thin paper, metallic foils, or other similar substances. Thus the letters are not united permanently, as if they were cast together; but they are sufficiently so for the purpose of speedy composition; and the above-mentioned difficulties are removed; for, first,—they are cheap, and may be manufactured at a moment's notice, as will be presently explained; secondly,—when one letter is injured, it may be thrown into the "waste-box," and the others preserved; thirdly,—on account of the smallness of the surfaces over which the compositor's hand has to travel in composing, by means of the authoriton, above described, an additional space, containing numerous logo-types and phraso-types, can be well afforded; fourthly,—in case of not being able to justify, by the usual means of "getting in" or "driving out" at the end of lines, one or more letters of such logo-type or phraso-type may be broken away, and transferred to the next line.

The material for uniting these types together is tinfoil. Having determined upon a logo-type to be manufactured, suppose the word "*the*," three heaps of types are placed before a boy, who then picks up successively the types *t*, *h*, *e*, which he places between the thumb and first finger of his left hand, with the faces upwards and the nicks next to him; he then takes a slip of fine tinfoil (the slips are made sufficiently long to go round all the four sides of the word *the*, plus about one-tenth of an inch; and their width is about half the height of the types), and having dipped one end of the slip into a solution of gum, about one-tenth of an inch, he places this end upon the nicks, and carries the slip round the word until the end overlaps the one first gummed. The boy then presses the whole slip on the surface of the types, particularly into the nicks (taking care not to cover the letters that were previously marked on the sides of the types), and puts the whole aside to dry; after which they are varnished.

The eighth improvement consists in omitting the spaces between certain words, as between the article "the" and any following word; between any preposition and any following word; between any conjunction and any following word; and between any pronoun and any following word: this is done in imitation of the Hebrew language.

The ninth improvement consists in making the inkingballs or rollers of some air-tight substance, which is filled with compressed air. Many substances may be used for this purpose, such as gut, bladders, Macintosh's impervious cloth, or sheet India-rubber. Fig. 12, represents an inking-ball; the back is formed of a disc of wood or any other suitable material, having a hole in the centre, in which is fitted a tube as a handle, furnished with a stop-cock; the lower part is a segment of a sphere, formed of an air-tight substance, attached to the disc with an air-tight joint. Air is pumped into the interior of the ball through the handle; and it is retained there by turning the stop-cock when filled. Fig. 13, represents a cylindrical inking-roller, to be worked by hand. To the iron axis two discs of wood are affixed. One end of this axis is made tubular, as shewn by the curved dotted line, and furnished with a stop-cock. An air-tight substance of skin, India rubber, or other suitable material, is attached to the discs, and made air tight at the joints by well known means. The air is then pumped in, and retained by turning the stop-cock. The roller is in all other respects similar to the ordinary ones, and is to be used in the same manner. Cylindrical rollers, intended for printing machinery, may be made in a similar way to that just described.

The last improvement consists in producing from the ordinary types or blocks raised characters. This is effected by laying upon the form of types a well wetted stout paper, and applying a greater pressure than usual. A surface of raised letters is thus produced, exactly similar to the surface of the composition; and the blind may be taught to read in the manner in which compositors read "in metal," viz., from left to right, and from the bottom upwards.—[*Inrolled in the Petty Bag Office, May,* 1847.]

Specification drawn by Messrs. Newton and Son.

To Thomas Edge, *of Great Peter-street, Westminster, in the county of Middlesex, gas-meter manufacturer; for his invention of improvements in the manufacture of gas-meters.*—[Sealed 31st December, 1846.]

It is well known to gas-meter manufacturers that the metal of which meters are usually constructed is liable to be injuriously acted upon by the gas, or certain matters that come over with the gas, which passes through the meter. It is also known that some of these destructive agents, such, for instance, as the ammonia contained in the gas, act more energetically in the presence of moisture than otherwise, as water takes up the ammonia; and when a solution of ammonia comes in contact with the metallic parts of gas-meters, as usually constructed, a voltaic action between the parts is induced, and the rapid destruction of the meter ensues.

The object of this invention is to prevent, or at least very materially to retard, the destruction of gas-meters from these causes; and for this purpose the patentee proposes to construct meters of plate-iron, which has been previously coated with metals (or an alloy of metals), capable of resisting the chemical action above mentioned. The metals, or alloys of metals, employed for this purpose are tin and zinc. Any of the known means for coating plate-iron with these or other metals, or alloys of metals, may be employed. The patentee does not, therefore, restrict himself to the use of metals coated by any particular process or processes; but he prefers to use plates coated in the manner or by the process described in the specification of a patent granted to Mr. Edmund Morewood, 27th August, 1841, or that described in the specification of a patent granted to Messrs. Morewood and Rogers, 4th May, 1843.* Or, he sometimes employs plates coated with an alloy of metals, consisting of equal parts of zinc and tin, or an alloy of which these or either of these metals form a component part, by the process described in the specification of a patent also granted to Messrs. Morewood and Rogers, 7th December, 1846.

It should be remarked, that it is important to make all the internal metallic parts of a water-meter of one and the same kind of metal, so that no voltaic action may be induced between the several parts; the internal solid parts of the meter should therefore be made of an alloy of metals, bearing some analogy to the coating of the plates or sheets of iron of which the case is constructed. For this reason, therefore, all the solid parts of the meter which are liable to be injuriously acted upon by the gas, or which come into contact with the water in the meter, are constructed of an alloy of metals, consisting principally of zinc and tin, in equal or nearly equal proportions. The proportions of this alloy may be varied, and other metals added, for the purpose of altering the hardness of the alloy, as is fully explained in the Specification of Messrs. Morewood & Rogers' patent of 7th December, 1846; but as a considerable degree of hardness is required for some of the parts, such as the spindles and wheels, the proportion of zinc ought to preponderate. For the purposes above-mentioned, an alloy consisting of from 50 to 70 parts of zinc, to from 50 to 30 parts of tin, will be found to answer the purpose.

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* For description of these inventions, see Vol. XXIV., p. 117, and Vol. XXV., p. 37, of our present Series.

The patentee states, that he does not intend to claim the exclusive right to use, for the manufacture of gas-meters, plates of iron coated with tin or zinc only, as plates so prepared would not answer the intended purpose; but he claims the application to the manufacture of gas-meters of plates or sheets of iron prepared with a coating of tin and then a coating of zinc, or with an alloy consisting of zinc and tin, or other metals, as above set forth; and he claims also making the solid internal parts of gas-meters of an alloy of metals, having zinc and tin as the basis.—[*Inrolled in the Petty Bag Office, June*, 1847.]

Specification drawn by Messrs. Newton and Son.

To ANTOINE PERPIGNA, *of Paris, in the kingdom of France, Advocate, for certain improvements in machinery for platting and braiding,—being a communication.*—[Sealed 21st December, 1846.]

THE object of this invention of improvements in platting or braiding machinery is to reduce the wear and tear now experienced in such machinery; to lessen the amount of driving power required; and to effect an economy in the first cost of the machinery. It is well known to all persons employed in the manufacturing of elastic and other braids, that not only is great accuracy required in forming and relatively adjusting the rotating "heads" or tables, which carry round the spindles of the platting or braiding bobbins in notches provided for their reception; but that, from the constant transference of the spindles from the notches of one head to those of the other, these heads quickly become defective at their edges, and require to be replaced with new ones;—the spindles are also worn away at the shoulder, thus adding considerably to the cost of working the machinery.

According to the present invention, the heads are stationary, and round their periphery a groove is cut, to receive the edge of a horizontal collar, attached to the spindle of the platting-bobbins. The plate in which the heads are set is also provided at the edge of its circular openings with a continuous groove, corresponding in height with those on the periphery of the heads; and between these two grooves the spindles of the braiding-bobbins are suspended by the collar before mentioned, which slides in the grooves, and follows a serpentine or other winding course to perform the braiding operation, by the means to be presently explained.

In Plate IX., fig. 1, is a plan view of the platting or braiding machine; fig. 2, is a side elevation of the same; and fig. 3, is a plan view of the gearing for driving the platting bobbins and their spindles. Fig. 4, is an enlarged vertical section of the fixed head and the bobbin, carrying the elastic or non-elastic strand which is to form the ground of the fabric (in this figure the parts for driving the traversing-bobbins are also shewn); and fig. 5, is a plan view of the same. It is obvious that the width of the fabric will be determined by the number and the diameter of the strands which form the groundwork for the plat; and as, by this invention, any required width of braiding may be produced, the patentee does not confine himself to the use of any given number of strands, which are to be laid side by side; although, in the machine represented by the drawing, four strands only are employed; but the action of the parts for forming the four-strand plat or braid being explained, it will be readily understood how the production of a plat of any other number of strands may be effected.

A, is the main-framing of the machine; and B, is a horizontal table, to which the vertical stationary spindles *a*, are bolted (see fig. 2). Each of these spindles *a*, (see the detached view, fig. 4) passes through and supports, by means of a step or collar at its lower end, a hollow axis *b*, which is provided with arms or projections *c*, at top, and at bottom carries a pinion *d*. The pinions *d*, form a train of gearing (see fig. 3,), and receive motion from a cog-wheel *e*, the shaft of which is connected with any first mover. *f*, is a metal plate, supported by the framing A, and furnished with circular openings, cut in it to receive the stationary circular heads *g*, which are keyed on to their respective shafts *a*. Between these parts *f*, and *g*, a space is left, to allow the traversing spindles *h*, *h*, (which are suspended by the sides of the collars *i*, taking into the circular and serpentine grooves) to move freely. These spindles, instead of being tubes, as in the ordinary construction of braiding machines, are formed as shewn in the drawing. The plan or edge of the collar is ovular in form, to allow of its following the course of the grooves, without permitting the independent rotation of the spindle. The upper part of the spindle is hollow, as in the ordinary construction, and carries the bobbin *j*, which holds the silk or other thread for binding together and covering the strands which form the base of the fabric. *k*, *k*, are the weighted rods for keeping the thread of the bobbins *j*, *j*, in tension, while they perform their revolutions round the strands; and when arrived at a given point in their course, any thread which may have become broken will allow its respective weight to fall, and stop the machine in the manner ordinarily adopted in machines of this description. The latch for regulating the unwinding of the bobbin, and the back for guiding the thread, being of the same construction as those generally used, a description thereof will be unnecessary. The upper part of the fixed spindle *a*, is hollowed out, and in it a tube *l*, is fitted, and is supported thereby. At about the middle of its length the tube *l*, is provided with a collar, which rests upon the top of the spindle *a*, and is prevented from turning by a pin, projecting from the spindle, and passing through the collar. The tube *l*, is intended to form the spindle for the bobbin *m*, which carries the elastic or non-elastic strand, and is placed above the head or table *g*; *n*, is a weight, suspended in the hollow of the spindle *a*, for the purpose of holding the strand in tension as it is unwound from the bobbin *m*. The several threads and strands of the bobbins are gathered up in the usual way, and brought to the braiding point of the guiding-bar c, attached to the main framing A: the machine is now ready for operation. Rotary motion being communicated to the wheels *e*, and *d*, the hollow axis will be caused to revolve, whereby the arms *c*, will be brought into contact with the spindles *h*, *h*, and push them forward in the grooves. They will thus commence the lapping of the thread round the strands of the bobbins *m*; but in order to unite or tie one strand with the next adjoining, it is necessary to guide the spindles *h*, round the next strand. This is effected by the guides *o*, which are attached to the plate *f*, in such a manner as to be allowed to rock freely thereon, but which are confined in their movements by stationary pins *p*, *p*. The guides are formed with three arms, (see the plan view, fig. 1,) and are respectively moved by the spindles *h*, as they are forced round by the rotation of the arms *c*. By thus causing the spindles to traverse the endless slot formed by the fixed heads *g*, and the plate *f*, the bobbins of these spindles will respectively lap a thread round the stationary strands, and produce the platted or braided fabric desired. The fabric is kept at an equable tension by any convenient arrangement of take-up motion,—it being drawn off from the guiding-bar by the pulley B.

The patentee claims, First,—the mode, hereinbefore described, of supporting the spindles of the traversing-bobbins, whereby they may take a serpentine or other winding course, suitable for producing a plat or braid, without being subjected to the injurious friction consequent on the employment of the rotating heads or tables. And, Secondly,—the mode of driving the traversing-spindles, as above described. [*Inrolled in the Petty Bag Office, June*, 1847.]

Specification drawn by Messrs. Newton and Son.

To Francis Henry Waller, *of Harrington-square, in the county of Middlesex, surgeon, for improvements in apparatus for making and filtering infusions of coffee and other articles.*—[Sealed 16th February, 1847.]

This invention relates to the apparatus used for making and filtering infusions of coffee, wherein water, heated in a lower vessel, rises through a pipe or passage into the lower compartment of an upper vessel, and passing through the ground coffee, which is deposited on a perforated plate (or it may be in a bag) at the lower part of the upper vessel, mixes with the coffee, and extracts the virtue therefrom. The heating of the lower vessel being discontinued, when this effect is produced, a partial exhaustion soon follows in the lower vessel, and the liquid in the upper vessel consequently descends, by atmospheric pressure, through the ground coffee, and down the pipe or passage into the lower vessel, from which, after the whole of the liquid has descended, it is drawn off for use while hot. The object of the present invention is to render the operation of the apparatus more perfect and manageable, by causing the hot water, which is forced upwards, to descend gently upon, and flow over, the ground coffee or other article, and rest quietly thereon, so long as may be desirable, instead of being forced upwards through the same; and when the partial exhaustion afterwards takes place, it is not allowed to begin to operate for forcing the liquor downwards until the infusion is completely made; and then, on a cock being turned, the filtration of the liquid through the coffee or other article commences.

In Plate VIII., fig. 1, is a vertical section and fig. 2, a plan view of the improved apparatus. *a*, is a vessel, divided by a horizontal partition *b*, into two compartments, corresponding to the upper and lower vessels before mentioned; in the centre of the partition *b*, an upright pipe *c*, is fixed, furnished at the top with a valve *d*, opening upwards; this valve permits the hot water (which is caused to ascend the pipe by the action of the steam in the lower compartment) to flow over the upper edge of the pipe into the upper compartment; but when the formation of the partial vacuum in the lower compartment commences, the valve closes the end of the pipe, and thus cuts off the communication between the two compartments. The centre portion of the partition is dished or hollowed; the sunken portion is covered with a perforated plate *e*, on which the coffee or other matter is deposited; and from the bottom of the sunken portion a bent pipe *f*, descends, provided with a cock *g*, the handle of which projects through the side of the vessel. When the infusion is completely made, the cock *g*, is opened, and the atmospheric pressure forces the liquid through the coffee or other matter, and perforated plate *e*, into the sunken portion of the partition *b*; from which it descends through the pipe *f*, into the lower compartment. The infusion may now be poured out of the vessel through the spout *h*, which is kept closed during the operation of making the infusion, by means of a screw-stopper *i*, or other contrivance.

Heat is applied to the above apparatus by placing it upon an ordinary fire, but it may be so modified in construction as to admit of being heated by other means. The perforated plate *e*, may be larger in diameter than is shewn, so as to occupy a larger portion, or even the whole of the bottom of the upper compartment; and it may be covered with flannel, felt, blotting paper, or other filtering medium, according to the article from which the infusion is to be made, as when making infusions of senna, gentian, hops, malt, &c. In order to obtain infusions of the kind called tinctures, spirits of wine (or spirits of wine diluted with water) must be substituted for the water employed when making other infusions. —[*Inrolled in the Rolls Chapel Office, August*, 1847.]

To Charles Stewart Duncan, *of the city of London, in the county of Middlesex, for improvements in public vehicles.*—[Sealed 2nd March, 1847.]

The object of this invention is to give greater publicity to advertisements, by constructing public vehicles in a suitable manner for the purpose of exhibiting the same. The invention consists, firstly, in constructing the roofs of public vehicles of glass, combined with either wood or metal framing, and so arranging such framing that the squares of glass may be taken in and out at pleasure, and that either one or two thicknesses of glass may be used; if one thickness of glass be employed, the patentee proposes to stain and burn in permanent colored advertisements on the inner surface of the glass, or to cement thereon a painted or printed advertisement upon a transparent medium; and if two thicknesses be used, the patentee inserts a printed or painted advertisement upon any transparent medium between the two thicknesses of glass. Secondly, the invention consists in illuminating this transparent roof by lamps, in order that persons may be enabled to read the advertisements by night as well as by day. Thirdly, in burning in colored advertisements on the side, front, or back lights of public vehicles; or placing printed or painted advertisements between two thicknesses of glass, to be used as side, front, or back lights of public vehicles. Fourthly, in covering the glass roof by night with a casing, formed of metal, or any other material, and lining such casing with reflectors, so as to equalize the distribution of light over the entire surface of the roof. Fifthly, in using stained or painted glass opaque advertisements, placed in a frame, and suspended from the interior of the ordinary roofs of public vehicles.

In Plate VIII., fig. 1, is a longitudinal section; and fig. 2, a transverse section of an omnibus. *a*, is the glass roof; *b*, the reflector or casing; *c*, *c*, the lamps. Fig. 3, is a plan view of the frame, attached to the roof of an omnibus to receive the opaque glass advertisements; and fig. 4, is a transverse section of an omnibus, exhibiting this frame *d*, applied to the roof, and another frame *e*, affixed to the end of the omnibus for the same purpose.

The patentee claims, Firstly,—the use of glass, as above described, for the roofs of public vehicles; also the using of either one or two thicknesses of glass, with the transparent medium between the glass, or with the painting and burning in of the said advertisement on the surface of the glass, to render it brilliant and permanent. Secondly,—the use of transparent advertisements on the side, back, or front lights of public vehicles, either burnt in or placed between, as above described. Thirdly,—the illuminating of the before-mentioned transparent roof, by means of lamps and an outer casing containing reflectors, as above described. Fourthly,—the use of painted or stained glass opaque advertisements for the interior of public vehicles.—[*Inrolled in the Rolls Chapel Office, September,* 1847.]

To Frederick Walton, *of Wolverhampton, in the county of Stafford, japanner and tin-plate worker, for an improved mode of coating or covering, or of coating, covering, and ornamenting the surfaces of articles which are or may be made of wrought iron, or of other metal or metals; which improved mode may be used in substitution of japanning, tinning, or other modes, now in common use, of coating, covering, or of coating, covering, and ornamenting such articles.*—[Sealed 24th February, 1847.]

This invention consists in an improved mode of coating or covering, or coating, covering, and ornamenting, the surfaces of articles made of wrought iron, or other malleable metal or metals that will bear a strong red heat without injury (such as brass or copper), so as to form a glazed enamelled surface on the articles; which enamelled surface may be either plain or ornamented.

As a first preparation for cleaning the surfaces of the articles, they are to be subjected to a full red heat in an annealing oven or furnace, or in a muffle, according to their size, for about half an hour; by this heating, all liquid, or semi-liquid, or greasy matter, will have been dissipated, and the surfaces of the articles will become oxidated; and then all oxide or scale is to be removed therefrom, by rubbing them with sand-stone, or using scrapers, or other suitable tools. The articles, thus cleaned, are ready to receive a first coat of partially vitrifiable materials, which is poured in a semi-liquid state over the surface of the article, and caused to distribute itself evenly thereon; the article is then placed in an ordinary japanner's stove, heated to 180°, and left therein until all moisture is gradually dried away from the semi-liquid covering, leaving the same in a state of dry whitish composition, which will adhere to the article, without it is roughly touched with the fingers.

The composition which the patentee has found most suitable for the first coating, is prepared as follows:—6 parts, by weight, of flint-glass, broken into small fragments, 8 parts of borax, 1 part of red lead, and 1 part of oxide of tin, are to be well mixed, by pounding in an iron mortar; and the mixture is to be "fritted" in the same manner as is usually done with the materials for making glass. 1 part, by weight, of the "fritt," so made, is to be mixed with two parts of calcined bone, ground to powder; and the mixture of fritt and bone is then to be ground with water in a "porcelain mill," until a semi-liquid, of the same consistence and appearance as thick cream, is produced, which, after being passed through sieves of fine lawn, is ready to be applied to the articles, as above mentioned.

When the first coating is dry, the articles are ready for firing, in order so far to vitrify the materials, as to harden the coating, and fasten it on the surfaces of the articles. The firing is performed in a furnace of the kind used by painters in enamel, and shewn in Plate IX.; fig. 1, being a transverse vertical section, and fig. 2, a longitudinal vertical section thereof. *a*, is an oven or muffle, built of fire-bricks, to receive the articles; it is open at one end, the same being closed when required, by letting down a door *b*; *c*, *c*, are the fire-bars; and *d*, *d*, are flues, leading into the chimney *e*. The muffle *a*, having been brought to a full red heat, the articles are introduced, and are left therein until the earthy composition has undergone so much of the commencement of fusion, or partial semi-vitrification, as to render the earthy particles of the coating firmly adherent to one another, and to the surface of the articles, which are then to be withdrawn from the muffle, and laid on a flat iron bench to cool; when cold, those parts of the surface which have been coated, present a dead whitish appearance, resembling earthenware in the state of "biscuit:" the time that the articles must remain in the muffle, varies from a few minutes to half an hour, according to the heat of the muffle, the size of the articles, and the number of articles in the muffle at the same time.

After the articles have become cool, the coating is wetted with water, and a second coat is then applied over the first coat, and dried thereon in the japanner's stove; it is then fired in the muffle in the same manner as the first coat. The composition for the second coat is prepared as follows:—A thick paste is made, by mixing 32 parts, by weight, of calcined bone, ground to fine powder, 16 parts of china-clay, 14 parts of Cornwall stone, in fine powder, and 8 parts of carbonate of potash, the latter being dissolved in water; the mixture is fritted for two or three hours in a reverberatory furnace, until it assumes the appearance of biscuit-china; and then it is to be reduced to powder. 5½ parts, by weight, of this powder, are mixed with 16 parts of flint-glass, broken small, 5½ parts of ground calcined bone, and 3 parts of ground calcined flint; and the mixture is reduced to the consistence of cream, by grinding in a porcelain mill, in the manner described for the first composition. In firing the second coating, care must be taken that the heat of the muffle is sufficient, and that the articles are kept in long enough to effect the thorough incorporation of the second coat with the first, and to harden both coats. After the second coating, the articles will have a stronger and whiter color, and bear a more decided resemblance to articles of good earthenware in the state of biscuit; but in case it is desired to give a very white color to the second coating, in order that it may resemble the finest earthenware in the state of biscuit, then, in place of the 16 parts of flint-glass, last mentioned, the patentee substitutes a like quantity of a composition, formed by mixing 4 parts, by weight, of pulverized felspar, 4 parts of white sand, 4 parts of carbonate of potash, 1 part of arsenic, 6 parts of borax, 1 part of oxide of tin, 1 part of nitre, and 1 part of whiting, fritting the mixture, and then reducing it to powder.

When the articles have become cool, after receiving the second coat, this coat is wetted with water, and a third coat is applied, and fired in a similar manner; and, when cool, the article will present the appearance of glazed earthenware of good quality, or of the best quality, in case the composition, last mentioned, has been substituted for the flint-glass amongst the materials for the second coat. The materials used for forming the third coat or glaze are, 12 parts, by weight, of pulverized felspar, 4½ parts of china-clay, 18 parts of borax, 3 parts of nitre, 1½ parts of carbonate of potash, and 1½ parts of oxide of tin: these ingredients are treated in the same manner as those for making the second coat. Instead of the materials and proportions just mentioned, the following may be used:—9 parts, by weight, of pulverized felspar, 2 parts of china-clay, 9 parts of borax, 2 parts of nitre, 3 parts of carbonate of soda, and ½ part of arsenic. In case there are any imperfections in the glaze, after it has been fired, then, when the articles are cold, another coat of the glaze may be applied, in a semi-liquid state, and dried in the japanner's stove, and fired in the muffle in the same manner as the first glaze: in like manner, a third coating of the glaze may be applied, if requisite.

The surfaces of the articles which have been coated or covered in the above manner, may be colored to some ornamental design, or may have enamel colors applied thereto, by pencilling or stencilling; or may be printed on, by transferring from the impressions taken on paper or on glue bats from engraved copper plates (or steel plates), in the manner commonly practised for ornamenting earthenware or porcelain; and gold may be applied for gilding the articles in the usual manner. In all cases, the ornamental coloring, painting, printing, or gilding is afterwards fixed in the glaze by firing in the muffle; and in firing the glaze on the surfaces of articles which are intended to be afterwards ornamented, the firing should not be carried to such an extent as to completely vitrify the glaze; but after the application of the colors, or printing, or gilding, then the required vitrification of the glaze may be completed in the act of finally firing or burning in the ornamental painting, coloring, printing, or gilding. In case it is required to give an uniform tint of color to all parts of the coating, then suitable metallic oxides, which will produce the required tints, are to be mixed with the ingredients of one or more of the different coatings, before the final grinding of the said ingredients in water in a porcelain mill.

The articles that have been coated, or coated and ornamented, in the manner above described, on one side (for the front, or inside, or most important side thereof), may afterwards have the opposite side (which will be the back, or under side, or least important side) coated with black glaze, applied with a sponge when in a semi-liquid state, dried on in the japanner's stove, and then fired in the muffle in the same manner as the other coatings. The black glaze may be composed of the same materials as either of the compositions, before described, for the third coat or glaze, with the addition of 2 parts, by weight, of oxide of manganese, and 1 part of cobalt; which materials are to be added to the other ingredients, previous to the mixture being fritted. If a deep blue glaze is preferred to black, then the oxide of manganese may be diminished or omitted; and so much as is omitted may be replaced, weight for weight, by cobalt, in addition to the quantity of cobalt above mentioned. Or, instead of the back or under side of the article being coated with black or blue glaze, it may be finished by japanning, according to the method usually adopted by japanners.

In conclusion, the patentee says, that his invention consists "in the improved mode, hereinbefore described, of coating or covering, or of coating, covering, and ornamenting, the surfaces (or parts of the surfaces) of articles which are or may be made of wrought or sheet-iron, or of sheet-brass, or of sheet-copper; the coating or covering consisting of, at least, three successive coats of partially vitrified and vitrified earthen materials, compounded and prepared as hereinbefore described (or similarly compounded and prepared), and applied on the surfaces of the articles in a semi-liquid state, and dried on, and then fired in the manner hereinbefore described; but each of the said successive coats being fired before another is laid on, so as, when completed, to form a glazed-enamelled surface upon the articles, bearing a resemblance to the surface of glazed earthenware; and which surface may be ornamented with printing or painting in colors, with gilding, if desired, of the same kind, or similar in appearance, to the ornamented surfaces of earthenware; such printing, painting, or gilding, being permanently fixed on the surface by firing."—[*Inrolled in the Rolls Chapel Office, August,* 1847.]

To John Isaac Hawkins, *late of Liverpool-street, King's Cross, but now of No.* 30, *Charles-square, Hoxton, in the parish of Shoreditch, and county of Middlesex, civil engineer, for certain improvements in holding together or filing letters, music sheets, newspapers, and other documents.*—[Sealed 10th March, 1847.]

The object of this invention is to produce an instrument that will grasp or hold together a collection of papers (such as letters, newspapers, sheets of music, &c.) in such a manner that they may be turned over like the leaves of a book, without the instrument presenting any inconvenient protuberance, which would prevent two or more of such collections of papers from lying compactly together in a portfolio; the instrument forming a kind of temporary binding, and occupying only a small space along the back of the mass of paper.

The first part of the invention consists in the construction of an apparatus for holding together or filing letters, newspapers, and other documents, which the patentee terms a "double grip collapsing clip."

In Plate VIII., fig. 1, is a side view and fig. 2, a back view of the instrument. It consists of two metal springs *a*, *b*, connected together at the centre of their length, by rivets or pins passing through two plates *c*, *c*, placed outside the springs, and through a plate of a horse-shoe form between them; this plate forms a recess for the reception of a ring *d*, when the instrument is placed in a portfolio; which ring is used for suspending the instrument from a nail, and is secured to it by a pin *e*, that passes through the ring. The elasticity of the springs gives them a tendency to approach each other, and thus the small pieces or jaws *f*, *f*, which project from the front edges of the springs, near their ends, are caused to gripe or hold the letters or other papers firmly, and in such a manner as to admit of their being readily turned over like the leaves of a book. The jaws are moved outward from each other, in order to release the papers, by applying the thumb and finger to the extremities a^1, b^1, of the springs.

The second part of the invention consists in an instrument termed the "double grip slide clip," or the "double grip clip." Fig. 3, is a back view, and fig. 4, an end view of this clip. In this instance, the elasticity of the springs *a, b,* acts in a reverse direction to that before mentioned, so as to cause the ends of the springs to recede from each other; but by sliding the rings or ferrules *g, g,* towards the extremities of the springs, the jaws *f, f,* are caused to approach each other and gripe the papers; and by moving the ferrules in the reverse direction the papers are released.

The third part of this invention consists in the addition to the clip represented at figs. 3, and 4, of two bars, which gripe the margin or back of a mass of papers throughout the whole or the greater part of the length, instead of the papers being held at two points only by the jaws *f, f.* Fig. 5, is a back view, and fig. 6, an end view of this modification, which is denominated the "bar-clip." The bars *h, h,* have small bent pieces *i, i,* (one of which is shewn detached) affixed to them, and into the spaces thus formed the jaws at the ends of the springs *a, b,* are inserted, being kept in their proper positions by a small pin or stud on each jaw entering a notch in each bent piece *i.* It will be evident that by moving the rings or ferrules *g, g,* the bars will be caused to approach to or recede from each other, and thus hold the papers between their bevilled edges or release the same.

The fourth part of the invention consists in a clip formed like a long hinge, containing within the knuckle a helical spring, which causes a pair of long bars or jaws to firmly gripe the back margin of the papers; the jaws being separated, when the papers are required to be released, by means of two levers or handles, projecting from the knuckle at the same side of the axis of the hinge as the jaws are situated. Fig. 7, is a side view of this clip; fig. 8, is a transverse section on the line A, B, of fig. 7; and fig. 9, is a view of the under side of the levers or handles, by which the jaws are opened. The clip consists of a tube *a*, containing a smaller tube, furnished with pivots or axes, which pass through the ends of the tube *a*, and work in openings in the brackets *b*, *b*: these brackets are screwed to a bar *c*, which is fastened to the back part of a book-cover *d*. The space between the exterior of the inner tube and the interior of the outer tube is occupied by a helical spring (shewn at *e*, where the outer tube is supposed to be broken away); one end of which is fastened to one end of the inner tube, and the other end of the spring is secured to the opposite end of the outer tube; so that the tendency of the spring to uncoil itself will cause the two tubes to move round in opposite directions; and, as one of the jaws or bars *f*, is fastened to the outer tube, and the other jaw f^1, is connected to the inner tube (by means of long screws, which pass through slots in the outer tube, and are screwed through circular openings in the inner tube, into a wooden plug within the same), the two jaws will approach each other and grasp the papers firmly. The jaws are opened, for the purpose of releasing the papers, by means of the levers *g*, *h*; the lever *g*, has ratchet teeth formed upon it, and is fixed on a square part of the upper pivot of the inner tube; the lever *h*, is mounted on the upper end of the outer tube, in such a manner that it may be moved round a short distance on the tube without turning it, but any further motion of the lever will cause the outer tube to turn (by a small stud on the under side of the lever coming in contact with a pin projecting from the tube *a*, as shewn at fig. 9,) and the jaws to open, when the lever *g*, is held against the book-cover: the reason that the lever *h*, is permitted to have this slight motion independently of the outer tube is, to enable the lever to lie within the closed portfolio alongside of the lever *g*, whatever may be the thickness of the mass of papers held between the jaws. A detent or click *i*, is connected to the lever *h*, and its end is caused to enter between the ratchet teeth on the lever *g*, when the levers are required to be kept apart; and the jaws of the clip thus held open, while the hands are employed in putting papers in or taking them out of the instrument.

The fifth part of the invention consists in an instrument termed a "slide-hinge clip." Fig. 10, is a side view of this clip, and fig. 11, is a section on the line C, D, of fig. 10. It consists of a tube *a*, containing an inner tube, the axes of which work in openings in the brackets *b*, *b*, fixed to the bar *c*. One of the jaws, *f*, is fixed to the outer tube, and the other to the inner tube, in a similar manner to the jaws of the clip just described, except that the ends of the long screws do not pass into the wooden plug, but terminate in the side of the inner tube. Motion is given to the jaws by the following means:—In the outer tube a longitudinal slot is formed, extending the greater part of the length of the same, parallel to its sides, and in the inner tube a longitudinal slot is also formed, of the same length, but winding helically about one-sixth of a revolution in its whole length. A ferrule or ring, *g*, encircles the outer tube, and from it a stud or screw projects through the slots of both tubes, and is screwed into a solid plug inside the inner tube. On the ferrule being slidden from one end of the tube to the other, the stud will cause the inner tube to make one-sixth of a revolution within the outer tube, and thus the jaws will be made to approach each other to a corresponding extent.

The patentee claims, "Firstly,—the holding together or filing of letters, music sheets, newspapers, and other documents, by means of jaws, which grasp or clip the papers together at two points of the back margin thereof, more or less distant from the top and bottom; and which jaws are actuated by springs, lying parallel to the back margin of the papers so held together; which springs, according to one mode of action, are compressed by their own elasticity, and released by the thumb and finger, as exemplified in the double grip collapsing clip; and, according to another mode of action, they relax by their own elasticity, and have their griping force brought to bear upon the papers by means of rings or ferrules sliding upon the springs, as exemplified in the double grip slide-clip or double grip-clip. Secondly,—the holding together or filing the whole or a large part of the length of the margin of a mass of papers, by means of a combination of the double grip slide-clip with bars; and which modification is called the bar-clip. Thirdly,—the holding together or filing of papers by means of a clip formed like a long hinge, containing a helical spring within the knuckle; which spring presses a pair of long bars or jaws firmly on the back margin of the papers throughout their whole length; which jaws are separated by means of two levers or handles, projecting from the knuckle on the same side of the fulcrum as the jaws. Lastly,—the application, for the purpose aforesaid, of the clip called the slide-hinge clip, which is formed like a long hinge, consisting of a tube revolving concentrically within another tube; these tubes carrying a pair of bars, made to open and shut by means of a stud sliding in a longitudinal straight slit in one tube, and in an oblique or winding slit in the other tube."—[*Inrolled in the Inrolment Office, September*, 1847.]

To John Gedge, *of Wellington-street, Strand, Gent., for certain improvements in the machinery or apparatus used for watering grain,—being a communication.*—[Sealed 8th February, 1847.]

The patentee commences his specification by stating that foreign grain, previous to being shipped, is highly dried, otherwise the moisture it would absorb in the voyage would tend to turn it mouldy, or cause it to become heated. When grinding this grain, the miller experiences great difficulty in separating the meal from the pellicle; consequently, the meal and pellicle become mixed, and a bad color is thus given to the meal. To remedy this, water has been applied to the grain, by means of a watering pot, when the grain has been spread over a floor; but in this way the moisture has been very unequally applied;—the patentee, therefore, proposes to use the apparatus shewn in Plate IX.

Fig. 1, is a side elevation of the apparatus, partly in section; fig. 2, is a vertical section, and fig. 3, a front view, on an enlarged scale, of that part of the apparatus where the water is brought into contact with the grain. The grain is first cleansed from dirt or stones, and is then raised from the receptacle containing it, and caused to fall into the hopper *a*, by means of an endless band with cups *b*, *b*, fixed thereon, passing through the troughs or channels *c, c,* or by other suitable means. From the hopper the grain descends through the tube *d,* to the watering apparatus, which consists of two horizontal chambers or vessels *e, f,* connected at their ends by two other vessels *g, h;* and these vessels are supplied with water from the reservoir *i,* by the pipe *j.* In the under side of the chamber *e,* and the upper side of the chamber *f,* perforations or slits are formed, through which the water issues in jets, as seen at *k,* so as to moisten the grain, as it descends from the tube *d,* through the watering apparatus, on to the inclined plane *l;* and the water from the chamber *e,* which does not come in contact with or is not carried off by the grain falls into the channel *m,* and runs away through the pipes *n, n;* while the water which ascends from the chamber *f,* is dashed against the curved cover *o,* and, running into the gutters at the lower edge of the same, passes away through the tube *p.* The grain descends the inclined plane *l,* into a cylinder *q,* covered with perforated plates of metal, and caused to rotate by a band passing round a pulley *r,* on the end of its axle *s:* by this agitation of the grain, as it passes through the cylinder *q,* (which is in an inclined position) the moisture that it has received becomes sufficiently absorbed to render it fit for grinding; and, on leaving the cylinder, it may be allowed to fall down the shoot *t,* into the mill. The tube *d,* is divided longitudinally by a board, which separates the grain into two streams, so that it will not touch the axle *s,* in falling down the inclined plane into the cylinder *q.*

To prevent the holes in the chambers *e, f,* from being choked with dirt or other matter contained in the water, a partition is fixed across the interior of the vessel *h,* below the opening at which the water enters from the pipe *j,* so that the water must pass into the upper chamber *e,* before it enters the lower chamber *f;* and when it is desired to clear out the chambers, the cock *u,* must be opened (the cock *v,* on the pipe *j,* being also open), in order that a powerful stream of water may carry off all sediment from the chambers *e, f, g, h.* There is a screw-joint in the pipe *j,* at j^1, to enable the watering apparatus, which is carried by the pipe, to be set to any required angle. *w,* is a pipe through which water is forced into the reservoir *i*. *x*, is a vessel or trough, placed beneath the front end of the cylinder *q*, to receive the surplus water which is separated from the grain by its agitation in the cylinder, and falls through the perforations into the trough.

The patentee claims the combining or arranging machinery for watering grain, as above described.—[*Inrolled in the Inrolment Office, August*, 1847.]

To Thomas Wright, *of Cooper's-hill, in the parish of Thames Ditton, in the county of Surrey, Esq., for certain improvements in apparatus for the production and diffusion of light.*—[Sealed 10th March, 1846.]

This invention consists in producing a permanent light, by continually presenting one or more fresh points or surfaces of carbon, or other suitable material, to the path of an electric current.

In Plate VII., fig. 1, represents the apparatus employed for carrying out this invention. *a*, is a double annular frame, constructed of wood, or other non-conductor of electricity, and enclosing five (or more) discs *b*, *c*, *d*, *e*, *f*, the axes of which turn in bearings attached to the frame *a*. The discs consist of two circular plates of brass, or other metal, enclosing between them a disc of plumbago or carbon (the latter being preferred), somewhat larger in diameter than the brass plates, about one-fourth of an inch thick, and having an angular or V-shaped edge. The axes of the discs *b*, *d*, *f*, are mounted in bearings fixed to the frame *a*; and the axes of the other discs, *c*, *e*, are mounted in sliding carriages, which can be moved backwards and forwards, by means of the screws *g*, *g*. The discs are made to rotate by means of an endless band, passing around pulleys on their axes, and connected with wheelwork, which is actuated by a weight or other prime mover, so as to cause the discs to rotate with a slow uniform motion; and a current of electricity being then passed through the series of discs, a brilliant light will be produced at those edges of the discs that are adjacent to each other. A current of electricity may be caused to pass through the discs, by connecting one wire of a galvanic battery with the axis of the disc *b*, and the other wire with the axis of the disc *f*; but, in order to economize the power, the patentee prefers to separate the battery into four parts, and transmit a separate and distinct current to each pair of discs, by means of the wires h^1, h^2, h^3, h^4, and i^1, i^2, i^3, i^4. In order to produce the desired effect, the discs *c*, *e*, are to be brought into contact with the discs *b*, *d*, *f*, by turning the screws *g*, *g*; and as soon as the electric current is established, and the points of contact sufficiently ignited, the discs *c*, *e*, are to be moved out of contact with the other discs, when a brilliant and permanent light will continue to be evolved at the adjacent parts of the discs, so long as the discs are kept rotating, and the electric current continues to pass.

In order that the electric light may be uniformly diffused, the apparatus is enclosed in a ground glass globe *j*; or, if the whole of the light is required to be thrown in one particular direction, a suitable arrangement of reflectors is employed, as shewn at fig. 2, whereby the whole of the light is thrown in the direction *k*, *l*.

The patentee does not confine himself to the above-mentioned materials, nor to any particular method of obtaining the electric currents, nor to the precise arrangement of mechanism shewn; but he claims, as his invention, a method of producing a permanent light, by continually presenting one or more fresh points or surfaces of carbon, or other suitable material, to the path of an electric current.—[*Inrolled in the Petty Bag Office, September*, 1845.]

To ANDREW CROSSE, *of Bloomfield, in the county of Somerset, Esq., for improvements in treating fermentable and other liquids, so as to cause impurities or matters to be extracted or precipitated.*—[Sealed 2nd March, 1847.]

THIS invention consists in submitting fermentable, fermented, and other liquids to the action of currents of electricity, for the purpose of extracting or precipitating impurities or other matters.

In treating wine, beer, cider, or other fermentable, fermented, or unfermented liquids according to this invention, the electric currents may be applied whilst the process of fermentation is going on, or before or after fermentation, except in the case of beer, to which the electric current should be applied after fermentation. When the liquids are treated during fermentation, no further alteration in the ordinary process is made, than the addition of the electric currents; and such liquids are to be attenuated to the usual extent, and then put into casks. The apparatus which the patentee considers to be most convenient for applying the electricity is shewn in Plate VII.; it consists of two porous tubes *a*, *b*, nearly immersed in the liquid to be acted on, so that their upper ends project a short distance above it; and when the apparatus is applied to closed vessels containing the liquid, the upper parts of the tubes must rise out of the vessel, and be open to the atmosphere: the tubes should each be five inches in diameter and sixty inches long, to operate upon five hundred gallons of liquid. The tubes contain water; in the tube *a*, is placed a cylinder of zinc, and in the tube *b*, a cylinder or coil of iron; and these are connected together by a metallic strip *c*. When the impure matters are not sufficiently precipitated by the electric action, the patentee passes the liquid through calico or other bags.

The action of the electric currents materially improves the character of the wine, beer, cider, or other liquid, and renders it less liable to become sour; by this means, also, any wine, beer, or other liquid, may be restored from partial acidity, or prevented from becoming more acid; and the impurities of spirituous liquors may be removed by the same process. The invention may likewise be used for separating impurities from other liquids or water; an apparatus, similar to that shewn in the drawing, being employed:—"the impurities of the water would be precipitated, and gaseous matter evolved, and any acid and alkaline properties would go to the porous tubes *a*, *b*." When sea-water is to be operated upon, it must first be distilled.

More powerful currents of electricity may be obtained, by substituting for the two cylinders of zinc and iron, two compound cylinders of zinc and iron; each compound cylinder consisting of two or more concentric cylinders of the same metal, with an opening extending from the top to the bottom of each cylinder, to allow the fluid, in which they are immersed, to pass between them; and the compound cylinders are connected by metallic strips.

The patentee claims, as his invention, applying electric action to extract or separate impurities or matters from fermentable, fermented, and other liquids.—[*Inrolled in the Inrolment Office, September,* 1847.]

To JAMES NAPIER, *of Shacklewell-lane, in the county of Middlesex, operative chemist, for improvements in smelting copper and other ores.*—[Sealed 2nd March, 1847.]

THIS invention consists in improvements in smelting copper ores, by treating them with fluxes, consisting of common salt, lime, and carbonaceous matters; and also in improvements in smelting ores, containing silver, or gold, or both those metals, by the addition of alkaline substances, coal, iron, and galena.

The first object is to facilitate the separation of the earth from the copper; and to effect this, when several ores of different descriptions are to be operated upon, the patentee mixes them in such proportions, in relation to the earthy matters or gangue they contain, as will cause the earths to unite in the furnace and form glass: the ores have been mixed in suitable proportions, when the silica in the mixture ranges from 50 to 75 per cent., in relation to the other earthy matters, which are generally mixtures of alumina, lime, baryta, fluor-spar, &c.,—the presence of oxide of iron greatly facilitates the fusion of the ores. Should the mixture (or the ore, when only one description of ore is being treated) not contain silica in the above proportion, the deficiency is to be supplied by the addition of sand; or, if the silica exceeds the above proportion, lime or fluor-spar is to be added.

After the above preparatory process, the operation is conducted in the following manner:—If the ore or ores should contain not less than 1 part of iron and 1 part of sulphur, to 2 parts of copper, an addition is made to every ton of the ore, of 56lbs. common salt, 40lbs. of slaked lime, and 100lbs. of coal, and the whole is fused in a melting furnace. When fused, the slag or scoria is skimmed off, and the furnace is tapped into sand moulds: the ingots or pigs, thus produced, are treated as hereafter described. If the ore or ores should contain less than 1 part of iron to 2 parts of copper, the deficiency is to be supplied by the addition of sulphuret of iron; or the ore is to be treated as before mentioned (omitting the coal); and after the fused mass has been skimmed, 30lbs. of scrap-iron are to be dispersed over the surface thereof, as equally as possible, and the door of the furnace is closed until the scrap-iron is melted; the furnace is then to be tapped into sand moulds. When the ingots, obtained in the above manner, are set, they are thrown into water, whereby they become disintegrated and fall into a fine powder; this powder is thrown into a heap, and allowed to remain for forty-eight hours; after which, it is removed to a calcining furnace, and treated in the manner described in the specification of a patent obtained by the present patentee, July 20, 1846.* The addition of black oxide of manganese, instead of iron, has been found to produce a similar effect, but not with equal advantage.

When ores containing little or no sulphur are operated upon, the above-mentioned processes of disintegration and calcination are omitted. The patentee commences, in this case, by mixing the ores, in relation to their earthy matters, so as to form glass, as above described (the ores, when containing no iron, might with advantage have a small quantity of oxide or carbonate of iron added); and then 80lbs. common salt, 50lbs. slaked lime, and 100lbs. anthracite coal, finely pulverized, are added to each ton of ore containing 10 per cent. of copper. If the ore should be richer in copper, a smaller proportion of salt and lime will suffice, and a greater proportion of anthracite of coal will be required: the patentee says, he has found, that for an ore containing 25 per cent. of copper, 56lbs. common salt, 50lbs. slaked lime, and 150lbs. anthracite coal will answer well. The mixture of ore and other materials is fused in a melting furnace, which, for a charge of 25cwt. of ore, will take from five to six hours; and then the fused mass is tapped into sand moulds: the copper, thus obtained, will generally be ready for the refining operation; but should a portion of the produce be regulus, it is to be roasted, and afterwards refined. Soda and several of its salts may be used instead of common salts; and so likewise may potash and several of its salts, or mixtures of these, free from sulphur.

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* For description of this invention, see Vol. XXX., p. 110, of our present series.

Sulphuretted ores of copper, containing silver, or gold, or both these metals, are treated in the following manner:—The ore is first calcined and fused, as in the ordinary smelting process, so as to produce a regulus, containing about 50 per cent. of copper; with every ton of this regulus, 56lbs. soda-ash, 40lbs. slaked lime, 1cwt. coal, 1½cwt. iron in scraps, and 4 cwts. galena (sulphuret of lead) are mixed, and the mixture is fused in a fusing furnace until the iron disappears; the fused mass is then well rabbled and tapped into sand moulds. The lead will be found reduced at the bottom of the first and second ingots, and will contain all, or the greater part, of the silver, or gold, or both, which the ore previously contained; these metals are afterwards separated from the lead by the ordinary methods of separating silver and gold from lead. The copper is treated in the ordinary manner, or as described in the specification of the patent before alluded to. Instead of galena, the oxide of lead may be employed; in which case the iron is dispensed with; but the patentee prefers to use galena.

When treating ores of silver, or gold, or both, which do not contain copper, or which do not contain it in the state of a sulphuret, the patentee adds copper pyrites thereto, in the proportion of 4 cwts. of the latter to 16 cwts. of ore, and then proceeds in the manner above described, viz., bringing the material into a state of regulus, and fusing it with soda-ash, lime, coal, iron, and galena.

In conclusion, the patentee says, that he does not confine himself to the precise details, or proportions of the ingredients used, so long as the peculiar character of the invention be retained.—[*Inrolled in the Inrolment Office, September,* 1847.]

To CHARLES TENNANT DUNLOP, *of Glasgow, in the county of Lanark, manufacturer, for improvements in the manufacture of alkali and chlorine, and in the application of the products resulting therefrom.*—[Sealed 16th March, 1847.]

THE first part of this invention consists in an improved method of producing chlorine, fit for manufacturing purposes, by the mutual decomposition of the following substances:—Muriate of soda, or any other muriate—nitrate of soda, or any other nitrate—muriatic acid—nitric acid. In some instances it is also requisite to use sulphuric acid; and the patentee generally prefers to employ it, in order to obtain, as a residual product, sulphate of soda, suitable for the manufacture of soda, &c. All the above materials may be employed together, or only two of them; as, for instance, a nitrate with a muriate (in which case sulphuric acid must also be used), or a muriate with nitric acid, or a nitrate with muriatic acid, or muriatic acid with nitric acid: in the latter cases, sulphuric acid is employed, according to the results desired to be obtained. The patentee says, he does not confine himself to any proportions, but that the process he usually adopts is, to bring together common salt, nitrate of soda or nitric acid, and sulphuric acid, in suitable proportions; heat being then applied, chlorine, an oxide of azote, and muriatic acid, are evolved; these gases are caused to pass through a condenser, charged with sulphuric acid, of sufficient strength to absorb the oxide of azote; and then the chlorine and muriatic acid are separated by means of water.

The second part of the invention relates to the application of the product resulting from the above process, and consists in the production of nitric acid from the sulphuric acid charged with oxide of azote, which is true nitrous sulphuric acid. This is effected by the aid of atmospheric air, steam, and water; and the process adopted by the patentee is, to introduce the nitrous sulphuric acid into a suitable vessel, and, by the addition of water and heat, to effect the disengagement of the oxide of azote, which, being caused to traverse a condenser, together with a sufficient quantity of air and steam, or water, is by this means transformed into nitric acid: this acid may be again used in the manufacture of chlorine, and again recovered, and so on. Sometimes, in place of treating the nitrous sulphuric acid, as just described, the patentee causes the oxide of azote to be evolved, and to pass into a chamber, into which a current of sulphuretted hydrogen is streaming; by which means sulphate of ammonia is obtained and sulphur deposited.

The patentee claims the manufacture of chlorine from the materials above mentioned, in the manner described; the process employed for separating the gaseous products, so as to obtain the chlorine in a sufficiently pure state for manufacturing purposes; and the two processes described for utilizing the products resulting from the manufacture of chlorine.—[*Inrolled in the Inrolment Office, September, 1847.*]

To Benjamin Dawson Norton, *of Cranford Bridge, in the county of Middlesex, Gent., for certain improvements in cranes and other hoisting and lowering machinery.*—[Sealed 1st February, 1847.]

This invention of improvements in cranes and other machinery for raising and lowering heavy bodies, consists in combining with a crane a weighing-machine or apparatus for ascertaining the weight of bodies raised and lowered by such crane.

In Plate IX., fig. 1, represents the improved crane in elevation; and fig. 2, is a partial plan view of the same. A, is the platform upon which the crane is erected; B, is the central vertical shaft or pillar upon which the crane turns; C, is the jib of the crane; and D, D, are the tension-rods by which it is sustained. E, E, E, is the rectangular frame that supports the machinery. G, is a horizontal shaft mounted in brackets extending from the rectangular frame, and to it a winch-handle is attached. This shaft may be driven by a pulley and band or chain, connected with a steam-engine or any other first mover; and being thereby made to revolve, a pinion fixed upon it, and taking into the ordinary toothed gearing of the crane, will cause the barrel K, to revolve also, and to wind on the chain L, L, L, attached to it. This chain L, passes over the pulley M, at the head of the jib; and, descending therefrom, supports the load N, below, which has to be raised. A contrary rotary movement of the shaft G, will allow the weight suspended from the chain L, to descend. Upon a horizontal shaft P, there is a ratchet Q; and a pawl R, hanging upon a stud in the side of the rectangular frame R, falls into this ratchet, for the purpose of preventing the load N, from descending, when the driving power is taken off the shaft G. The parts, thus far described, may be considered to resemble, in their construction and operation, an ordinary crane; but, by the following description, the novel parts or appendages, which are adapted to this crane for the purpose of enabling it to weigh heavy bodies, will be clearly understood.

On each side of the jib-head of the crane there are affixed bracket-pieces *a*, *a*, which are for the purpose of supporting the pivots or axle of a horizontal vibrating-lever or beam *b*, *b*; this beam or lever is, for convenience, made of two lateral bars, bolted together, as seen in fig. 2, by which the jib is allowed to pass freely through it. Small circular apertures in the bracket-pieces *a*, *a*, receive the knife-edges *c*, of the pivots or ends of the axle of the lever or beam *b*, by which the lever or beam is allowed to vibrate, as a scale-beam, in the bracket-pieces, with the least possible friction. To the longer arm of the lever or beam *b*, a vertical connecting-rod *d*, *d*, is attached by a joint-pin, with a knife-edge; and the lower end of this vertical rod *d*, is connected by a joint, also with a knife-edge, to a small lever or arm *e*, extending from a shaft or axle *f*; the axle having knife-edges above and below at each end. On this shaft, a steelyard *g*, is fixed, and a balance-weight or counterpoise *h*.

These parts *b*, *c*, *d*, *e*, *f*, *g*, and *h*, constitute a compound-lever, by which the amount of any weight, bearing at *i*, upon the shorter arm of the lever *b*, will be indicated in hundreds and quarters, by the amount of accumulated weights *k*, at the end of the steelyard *g*; and the odd pounds will be shewn by the sliding weight *k**, placed on the graduated scale. The shorter arm of the lever or beam *b*, is formed by a moveable piece *i*, having a hemispherical recess, and an opening or slit in front, for the free passage of the chain L, which piece *i*, may be raised upon its axle by a chain or cord *l*, *l*. When raised into the position shewn by dots in fig. 1, and secured in that position by a chain or cord, the crane becomes an ordinary crane, for lifting heavy bodies without weighing them; but when the heavy body suspended is required to be weighed, then the chain or cord *l*, *l*, is to be loosened, which will allow the moveable piece *i*, at the front end of the lever *b*, to drop down into the coincident horizontal position shewn at fig. 1. As the weight N, descends, the ball *m*, affixed to the pendant-chain L, coming down, and bearing in the hemispherical recess formed in the shorter arm of the lever *b*, will depress that end of the beam; and the compound-levers, connected to the reverse end of the beam, being by that means raised, the steelyard and index will shew the amount of weight suspended at N, by the chain L. The weight of the suspended goods having been ascertained, the chain L, must be drawn up sufficiently to allow of the moveable piece *i*, being again raised, as before described and shewn by dots, when the goods may be lowered and released from the crane.

The patentee states, that he does not intend to claim any novelty in the construction of a mere crane or other hoisting and lowering machinery; but he claims the adaptation to such description of machinery of a lever or balance-beam, constructed and mounted as shewn at *b*, *c*, *b*, in the drawing; such beam being connected to a steelyard or any other weighing machine, in such a manner as to afford the means of ascertaining the weight of any body suspended from a crane or other hoisting and lowering machinery.—[*Inrolled in the Petty Bag Office, August,* 1847.]

Specification drawn by Messrs. Newton and Son.

To George Fergusson Wilson, *of Belmont, Vauxhall, in the county of Surrey, Gent., for improvements in the production of light, and in the manufacture or preparation of materials applicable thereto.*—[Sealed 23rd March, 1847.]

This invention relates to the treatment of tallow oil, or oleic acid, which is obtained in the preparation of materials for making candles, and also from fats and oils generally. Tallow oil, or oleic acid, has not been hitherto used for burning in lamps, owing to its deposition, whilst burning, of a black matter, which in a short time extinguishes the light. Now this invention consists in combining it with oil that has not been converted into the acid state; by which means a product suitable for burning in lamps will be obtained, and the cost of lighting by oil will be materially lessened.

The mode of carrying out the invention is as follows:—100 gallons of lard oil, or of castor oil of commerce (when the latter is nearly as cheap as lard oil) are boiled with 100 gallons of liquid cocoa-nut oil (but the employment of the cocoa-nut oil is not absolutely necessary) by means of free steam, admitted through a worm; during the boiling, 5lbs. of oxalic acid are thrown in, and the boiling is continued for half an hour after the addition of the acid; the material is then left to settle for about half an hour, and the condensed water is drawn off. 100 gallons of fresh water are now introduced, and the mixture is boiled by free steam for half an hour; after which the steam is shut off, and 100 gallons of tallow oil, or oleic acid, are introduced; the boiling is then continued for about five minutes, and the mixture is left to settle for six hours; at the expiration of which time it is pumped into wooden vessels to cool, and when cool it is ready for use.

It is important that the tallow oil, or oleic acid, should be freed as much as possible from the mineral acid used in the manufacture by which it is produced. The patentee states, that the best mode of effecting this is by distillation; if, therefore, the distillation of the fatty matters, after they have been converted into an acid state, has not formed a part of the process of manufacture by which the tallow oil, or oleic acid, is produced, the patentee distils the tallow oil, or oleic acid, before mixing it with the unacidified materials, and filters it to separate the stearic acid contained in it. The patentee prefers to distil the oleic acid in the manner described in the specification of a patent granted to him in connection with George Gwynne, November 16th, 1843.* Instead of combining expressed acid oil with unacidified oils, the "combined oil" may be produced, though in a very inferior manner, by only partially saponifying fatty matters, and subjecting the same to pressure: the expressed oil would be partially acidified and partially unacidified; and such would be the case with the concrete matters, which would consist of stearine and stearic acid.

The patentee states, that although he has been particular in describing the exact means which he pursues, the particular oils which he prefers to use, and the relative quantities of the different materials he employs, he does not confine himself thereto; but he claims the manufacture and use, for the purposes of light, of an oil composed of tallow oil, or oleic acid, mixed with oil not in the acid state.—[*Inrolled in the Inrolment Office, September*, 1847.]

To George David Myers, *of Budge-row, in the city of London, engraver and printer;* William Cooper, *of St. Paul's Church-yard, in the city of London, bonnet manufacturer; and* James Wansbrough, *of Southwark-square, in the county of Surrey, hatter, for improvements in the manufacture of caps, bonnets, book-covers, curtains and hangings, show-cards or boards, labels, theatrical decorations, and coffins.*—[Sealed 31st December, 1846.]

This invention consists, firstly, in employing flocked fabrics and the process of flocking in the manufacture of caps and bonnets. With regard to caps, in place of making them of woollen fabrics, the patentees apply flock to one surface of a woven fabric of cotton or linen, and then form the caps of the same, with the flocked surface outwards, so that they will present a similar appearance to those made of woollen cloth; or the caps may be first made up, and either stiffened or not, and then flocked. The patentees employ the ordinary mode of applying flock to woven surfaces, which is well known, and separately forms no part of their invention. The bonnets are first made of card-board or a suitable stiff preparation of paper, and then flock is applied to the outer surface of the same: by this means, bonnets may be produced resembling woollen bonnets, without any seams being visible.

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* For description of this invention, see Vol. XXVII., p. 99, of our present series.

The second part of the invention consists in applying the process of flocking and flocked fabrics to the making of book-covers, either by first covering the books with cotton or linen fabrics and then flocking the same, or by applying covers of flocked cotton or linen fabrics to books that have been previously bound, in the manner ordinarily practised when applying cloth covers to books.

The third part of this invention consists in manufacturing curtains, hangings, and theatrical decorations, of calico or linen fabrics, flocked on one or both sides, instead of using woollen cloth. When the fabrics are flocked on both sides, the patentees sometimes use different colors for the two sides, so as to produce an appearance similar to that which would be exhibited if two fabrics of different colors were used, the one as a lining to the other; and each surface of the fabrics may be of one uniform color, or ornamental devices may be produced thereon by the employment of flock of different colors: in the latter case, the adhesive material by which the flock is attached to the fabric is applied to different parts of the surface of the cotton or linen fabric in succession, by means of printing blocks; and after one part has been flocked, the adhesive material is applied to another part; and this is repeated until the whole surface is covered with flock.

The fourth part of the invention consists in applying flock in the manufacture of show-cards or boards and labels. This is effected by printing, painting, or otherwise forming, with adhesive material, the ground or lettering, with or without ornamental devices, and applying flock to the same; then the remainder of the surface is to be coated with adhesive matter, and flock of another color applied thereto; so that the ground will be of one color and the lettering of another color. When more than two colors are to be employed, printing blocks, or other suitable means of applying the adhesive matter successively to the different parts of the surface, are to be used; and it is desirable to dry each part of the surface as it is flocked, before proceeding to apply adhesive matter to the other parts.

The last part of the invention consists in applying flock to the outer surface of coffins, instead of using woollen cloth for covering the same; or else in covering the surface with linen or other suitable fabrics, coated with flock: in either case, the ordinary metal furniture is to be applied in the usual manner.

The patentees claim, Firstly,—the manufacture of caps and bonnets by using flocked fabrics and the process of flocking, in the manner above described. Secondly,—the manufacture of book-covers by applying the process of flocking and flocked fabrics, as above described. Thirdly,—the manufacture of curtains and hangings, and also theatrical decorations, by employing fabrics of cotton or linen, flocked, as above described. Fourthly,—the manufacture of show-cards or boards and labels by the process of flocking, as above described. Fifthly,—the application of the process of flocking and flocked fabrics in the manufacture of coffins, as above described.—[*Inrolled in the Inrolment Office, June,* 1847.]

To JOHN ROBERT JOHNSON, *of Nelson-square, in the county of Surrey, chemist, for improvements in purifying gas, and in the treatment of products of gas-works.*—[Sealed 20th December, 1845.]

THIS invention consists, firstly, in a new mode of purifying gas (used for the purpose of illumination) from those impurities which consist of ammonia and its compounds. Ammonia exists in gas after it has passed the condensers, and before entering the lime purifier, in combination with several volatile acids; for example, the hydrosulphuric, hydrocyanic or prussic, and carbonic acid. When the gas has passed the lime purifier, these compounds have become decomposed—the lime combining with the acids before mentioned, and liberating the ammonia, which is then found in the gas in the uncombined or so called, caustic state. Various plans have been proposed to effect the separation of the ammoniacal compounds. Dilute acids have been employed, and likewise solutions of metallic salts, such as the chloride of manganese. These plans have, however, the disadvantage of requiring a considerable increase of pressure to force the gas through the fluid; and the use of motive power is sometimes required, to render the operation successful. To obviate these inconveniences, and to effect the separation of the ammonia, the patentee employs substances possessing the property of absorbing ammonia or its compounds, in the dry or, more properly speaking, solid state, instead of in the state of solution, as has been hitherto practised. All the fluid substances which possess the property of absorbing ammonia and its compounds have, as far as the patentee's experiments extended, been found to possess the same property when employed in the solid state, provided they were used in a divided or pulverulent form; and that they contain sufficient water of crystallization or hygrometric moisture, to bring the gas and solid matter within the sphere of affinity. The substances which possess this property may be divided into two classes:—First, those which act on the compounds of ammonia in the manner of the acids; that is to say, which absorb the ammonia only, and which liberate, or only partially absorb, the acids with which it was previously in combination. Among this class of substances are comprised the solid acids, such as the phosphoric, boracic, and other acids; the salts with excess of acid, as the bisulphates of potash, of soda, and of ammonia—the biphosphates of these bases, and other salts of this class; the salts of alumina, and of some other earths. Second, those substances which absorb the compounds of ammonia entirely, acid as well as base, entering into combination with the components of the substance used: the metallic salts, containing the requisite quantity of water, are comprised in this class, and will serve more or less perfectly for the purpose required; but the salts of iron and manganese, from their cheapness, will be found preferable to others.

The mode which the patentee adopts for carrying out this part of his invention is as follows:—He takes, for example, one of the substances included in the second class, viz., the sulphate of iron, or common green copperas of commerce, (as usually found in commerce, it is in the state of crystals, dry to the touch, but containing a large quantity of combined water, or water of crystallization) and this salt he reduces to powder in the ordinary way:—the finer the powder the more complete will be the decomposition of the salt by the ammoniacal compounds. This powder is employed in precisely the same manner as the moistened lime is used in what are called dry lime purifiers; that is to say, it is spread upon the shelves of a purifier, constructed like that used for the dry lime only; and the subsequent part of the process is the same as with dry lime; the cover being lowered and sealed, and the gas allowed to pass, until the application of a piece of turmeric or other test paper shews that the material ceases to absorb the ammonia. When this point is arrived at, the gas is turned into another purifier, similarly prepared, and the one just saturated is emptied. It should be remarked, that although but one purifying vessel is mentioned as being used at a time, yet the operation is more perfectly effected when a series is employed, as in the lime purifiers, and as is well understood. The purifier, or series of purifiers, containing the substance used for absorbing the ammonia, is preferred to be placed so as to receive the gas before it enters the lime purifiers, as the acids in combination with the ammonia are then absorbed by the substance (when belonging to class second), the quantity of time required for the purification of the gas is diminished, and the union of one of these acids (the hydrocyanic) with the salt of iron gives rise to a useful product. When employed subsequently to the passage through the lime purifiers, one of the substances of class one will be found most advantageous.

The patentee finds the water of crystallization in sulphate of iron is sufficient to bring the salt into a fit state to effect the absorption of the ammoniacal compounds; but he does not confine himself to the use of salts in their natural state; for the salts may have a certain quantity, more or less, according to their nature, of water added beyond that which they naturally contain: the powdered sulphate of iron, for instance, if slightly moistened, so that it hangs together, acts equally, as in the former case, and rests better upon the shelves of the purifier.

The patentee remarks, that he is aware of substances having been used in the dry form for increasing the illuminating and diminishing the heating power of gas, after it has left the distributing main, and before it enters the burner; he does not, therefore, claim the use of dry substances for such objects, when used under such circumstances; but, under the first part of his invention, he claims the use of substances in the dry or solid form, and in a divided state, for the purpose of separating from gas (used for illumination) those impurities which consist of ammonia and its compounds; the acceptation of the word *dry* being the same as when employed with reference to lime used in what are called "dry purifiers," and in contradistinction to solution.

The second part of the invention consists in a new mode of treating the ammoniacal liquor of the gas-works, for the purpose of preparing the salts of ammonia in a purer state than they have been usually obtained, and without the noxious exhalations which attend the ordinary mode of operating. In treating the ammoniacal liquors by the ordinary process, a large quantity of highly offensive and deleterious gas (sulphuret of hydrogen) is evolved; and, to remedy this inconvenience, it has been proposed to distil the liquor, mixed with a large quantity of lime,—condensing the vapours and passing the products of condensation into an acid. Another plan is, to evaporate the liquor with or without lime, and to pass the vapours through acid without condensation. In the former case, in carrying the operation into practice on a large scale, it was found that deposits of lime were obtained, and that the process was thereby rendered dangerous, and otherwise objectionable. According to the second plan, unless lime be used in the evaporation, the operation is unsuccessful, as the noxious gas is generated when the vapours come into contact with the acid, and must be got rid of, thus resembling the old process. These inconveniencies the patentee proposes to obviate, by operating in the following manner:—The liquor is placed in a vessel, similar to an ordinary steam-boiler, and heat is applied thereto by means of a furnace. The liquor consists principally of hydrosulphuret and carbonate of ammonia, with small quantities of other salts of that base. As soon as the temperature rises, the hydrosulphuret of ammonia comes over, it being the most volatile product: a slow fire is kept up, so as to volatilize this product exclusively; and, as it is given off, it is conducted by a branch from a horizontal pipe into a vessel containing a solution of some substance which has the property of absorbing the sulphuretted hydrogen—the deleterious gas. The salts of iron and manganese possess this property, as has been already stated; and alkalies or lime, mixed with water, will also effect the same object. In the former case, the product, after sufficient of the vapours have passed to saturate the material employed, is a solution of a salt of ammonia, holding in suspension the sulphuret of iron or manganese. In this plan, one vessel for holding the material through which the vapours are passed, is sufficient; but, if more be employed, they are charged with the same solution. When lime or alkali is used to absorb the sulphuretted hydrogen, the ammonia is liberated, and must be conducted into a second vessel, charged with an acid. At the end of this part of the operation, that is, when all the hydrosulphuret of ammonia has passed over, the products found in the first vessel are sulphuret of lime and some free ammonia; and in the second, a solution of a salt of ammonia. If the acid was but slightly diluted, the solution may be obtained saturated, and fit to crystallize on cooling. The liquid remaining in the boiler, and now consisting principally of carbonate of ammonia, may be treated in the ordinary way for preparing the salts; that is, it may be neutralized with an acid, and the resulting solution evaporated in lead vessels, to obtain the crystals of the ammoniacal salts, as is well understood; or the evaporation may be continued in the boiler, at a higher temperature, in order to drive over the other volatile salts, and the vapours passed through acid, to absorb the ammonia. In the latter case, the apparatus just described may be used, a cock in the horizontal pipe being opened. The vapours then pass through the horizontal pipe, and down a branch pipe into the second vessel, containing the acid, without entering the first vessel, containing the lime, and are then absorbed. The evaporation is continued until the volatile salts of ammonia are all driven off, when the liquor in the boiler may be rejected, unless it be found that the fixed salts remaining in the liquor are in sufficient quantity to be worth extracting, which may be ascertained, approximatively, by evaporating a drop of the liquor on a strip of glass, or, accurately, by evaporating, nearly to dryness, a known quantity of the liquor, and by weighing the resulting salt. These fixed salts may be obtained by entirely evaporating the liquor in a lead vessel, or by adding to the liquor, while in the boiler, a certain quantity, more or less, according to the quantity of the fixed salts present, of sulphuret of lime in solution. This substance may be obtained from the first part of the operation, when lime is used, or from the liquor of the wet purifiers of the gas-works. The sulphuret of lime decomposes the fixed salts of ammonia, liberating the latter substance in the state of hydrosulphuret, which may be treated in the same manner as that evolved in the first stage of the process.

Under this head of the invention the patentee claims the mode of treating the ammoniacal liquors of gas-works as herein described.—[*Inrolled in the Inrolment Office, June, 1846.*]

To FREDERICK RANSOME, *of Ipswich, in the county of Suffolk, engineer, for improvements in working coke and other kilns or ovens.*—[Sealed 24th February, 1847.]

THIS invention relates to the cooling of coke and other kilns or ovens, by causing air to circulate through flues or passages used for cooling kilns or ovens and the charges therein.

The patentee states, that of late the cooling of coke-kilns or ovens has been effected by means of air-flues or passages, arranged in such a manner as to allow air to circulate freely in contact with the inner lining of the kiln or oven, without coming into contact with the charge in the kiln or oven; such circulation being caused by the rarefaction of the air by the heat of the flues. This mode of working coke-ovens is described in the specification of a patent granted to J. Church, December 20, 1845, and is very superior to the old mode, where the charge was drawn hot, and cooled by water; but yet the time of cooling a kiln or oven by the new mode is very uncertain, depending on the state of the outer atmosphere; and it is important to cool the charge as quickly as possible, so long as the atmosphere is excluded from it. In coke-ovens, constructed according to Mr. Church's patent, the air, after passing through the flues, rises through a short pipe into the atmosphere, by its levity; the pipe having little, if any, effect in causing the circulation of the air through the flues. Now, the present invention consists in expediting the draft, and thereby causing the cooling to take place more rapidly. This the patentee prefers to do by connecting the air-flues with a rotary fan or blower, in such a manner that the air will be continuously withdrawn from the flues, and the external air rushing in will quickly cool the charge. Although the patentee prefers to use a rotary fan or blower, he does not confine himself thereto, as other arrangements of blowing and exhausting apparatus may be employed; or, in place thereof, the air-flues, or the pipe from the same, may be conducted into a high shaft or chimney; but the action of a rotary fan or blowing machinery is more certain and uniform; and there is also this advantage attending the use of blowing machinery, that the heated air propelled thereby may be conducted by pipes into drying-rooms, or places required to be heated.

This invention is not confined to coke-ovens, but is applicable to other kilns or ovens, wherever flues or passages may be made in the bottom, sides, or other parts thereof, so as to have streams of air drawn or forced through by suitable apparatus.

The patentee claims applying mechanical apparatus or means to air-flues of coke or other kilns or ovens, for the purpose of quickening the passage of air through the same, and thus more readily cooling such kilns or ovens and the charges therein.—[*Inrolled in the Inrolment Office, August,* 1847.]

To HENRY BEWLEY, *of Dublin, chemist, for certain improvements in flexible syringes, tubes, bottles, hose, and other like vehicles and vessels.*—[Sealed 4th September, 1845.]

THIS invention consists in manufacturing flexible syringes, tubes, bottles, hose, and other like vehicles and vessels, by the employment of gutta-percha, which may be used, either in its natural liquid state, in an artificial state of solution, in a plastic state, a sheet state, a granular state, or in a state of combination with other substances; and the patentee either procures it in these states ready for use, or he reduces it to these states by the methods described in the specifications of patents granted to R. A. Brooman, March 11, 1845, and March 27th, 1845.*

Firstly, the patentee makes the above articles wholly of gutta-percha, by pressing the same, in a plastic state, into or upon and over moulds of the desired shape. Or he applies it, in a liquid state, to the outer surface of suitable moulds, adding several coats in succession, until the required thickness has been produced, and allowing each coat to dry before another is added (the mould being made of plaster, or clay, or some other material that may be broken up after the cast has been obtained); or he pours the gutta-percha, in a liquid state, into moulds, and leaves it to solidify. Or suitable moulds are filled with gutta-percha, in a granular state, and subjected to a heat sufficient to melt that substance, which, on cooling, will be found to retain the exact shape of the moulds. Or sheet gutta-percha, of a suitable thickness, is cut into strips or pieces, of such shapes, that when combined, they will form the required vehicle or vessel; and these pieces are joined together by overlapping and cementing, or by cementing them together edge to edge, by heating the edges, or by coating them with a solution of gutta-percha or caoutchouc, or by compressing them strongly together. When making tubes, hose, and such like articles, the gutta-percha, in a plastic state, is introduced into a cylinder containing a solid piston; by the descent of which, it is forced through holes in the bottom into a cup, from whence it passes out through a tube (surrounded by a steam-jacket, and containing a core, to impart the desired tubular form to the gutta-percha), and descends into a vessel containing cold water. Instead of the above method, tubes and hose are made, by rolling one long strip of sheet gutta-percha round a mandril, in a spiral or other direction, and cementing it together at the edges, either by the application of heat, or of a solution of gutta-percha or caoutchouc, or by passing the mandril, with the roll of gutta-percha upon it, through grooved-rollers, or by immersing the mandril, with the gutta-percha upon it, in hot water, or subjecting it to the action of hot air for a sufficient time. If it should be desired to give a polished or figured surface to any vessel that has been produced with a dull or plain exterior by any of the above methods, the vessel is to be introduced into a metal mould, smooth or figured on the inside, and hot water or hot air is forced into the vessel, so as to press it out against the inner face of the mould, and into every line, hole, or indentation which there may be in it. The patentee remarks that gutta-percha being a substance that is but little, if at all, affected by oils, grease, or acid, or alkaline fluids, is very suitable for surgical instruments, such as catheters, &c.

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* For descriptions of these inventions, see Vol. XXVIII., p. 236, and Vol. XXVII., p. 339, of our present Series.

Secondly, the patentee manufactures the before-mentioned articles, by the above processes, of gutta-percha combined with other substances, as, for example, with cloth or leather, or with caoutchouc, sulphur, French chalk, emery, or asphalte, as described in Brooman's specifications. Sometimes the patentee substitutes for the sulphur in such combinations an equal quantity of pulverized calamine; or he uses equal portions of sulphur and calamine.

Thirdly, the gutta-percha is used, both in the simple and mixed states, as a coating for flexible syringes, tubes, bottles, hose, and other like vehicles and vessels (the bodies of which are made of other materials, as caoutchouc, leather, cloth, &c.), in order to render the same waterproof, and to enable them to resist the action of oils, grease, or acid or alkaline fluids; the coating being applied either to the inside or outside, or to both. The articles may be dipped in a solution of gutta-percha; or the gutta-percha, in a liquid state, may be laid on with a sponge or brush; or it may be applied in sheets, cemented to the articles by a solution of gutta-percha or caoutchouc, and joined at the edges by any of the methods before described. A continuous coat of gutta-percha, without break or joint, may also be applied to tubes and hose, by passing the same through the holes of a steam draw-plate or box, similar to those used for drawing lead pipes, and heated to about 230°; these holes, which are of a conical form, with the broad end innermost, and are in their least diameter a little larger than the tubes or hose, are supplied with gutta-percha, in a soft or semi-fluid state, so that as the tubes or hose are drawn through the mass of gutta-percha, they become coated therewith.

Fourthly, when caoutchouc has been employed for coating flexible syringes, tubes, bottles, hose, and other like vehicles and vessels, made of some other material, the patentee applies to it a coating of gutta-percha, in order to prevent the inconvenience resulting from the stickiness of the caoutchouc, and negative its susceptibility to the action of grease and oils;—the gutta-percha should be used in a liquid state, and only a thin layer of it should be applied.

Fifthly, if any of the above articles, manufactured from gutta-percha, in the simple or mixed state, should be required to have a certain degree of flexibility imparted to them, they are subjected to the action of sulphur, either by dipping them in a bath of hot sulphur or exposing them to the fumes of burning sulphur, as described in Brooman's first specification.

Sixthly, the above articles are made of a variety of colors, by mixing the pigments or other matters suitable for imparting such colors with the gutta-percha employed in the manufacture thereof.

The patentee states, that he lays no claim to any of the before-mentioned modes of preparing the gutta-percha, or of giving it form or figure; but he claims the application of gutta-percha, in any of the states, and by any of the processes before mentioned, to the manufacture of flexible syringes, tubes, bottles, hose, or other like vehicles or vessels, or to the improvement of such articles after manufacture, as above described.—[*Inrolled in the Inrolment Office, March*, 1846.]

Scientific Notices.

ON A CENTRIFUGAL PENDULUM, BY WHICH PERFECT ISOCHRONISM MAY BE OBTAINED.

BY M. PECQUEUR.

[*Translated for the London Journal of Arts.*]

It is well known that rotating or (as the French call them) conical pendulums, are not isochronous, unless they constantly describe the same cone during their rotation; but as, in practice, the motive force and the resistance cannot be always precisely the same, it is impossible to accomplish this, so much desired object, without modifying the pendulum in such a manner that the revolutions, whether great or small, shall always be accomplished in the same space of time. This is, in fact, the great difficulty; and in order to solve it, M. Pecqueur laid down the two following rules, as the basis for his proceedings:—

1st. If a pendulum, capable of turning freely round a fixed vertical rod, possessed the property of lengthening or shortening itself, so that while describing cones of greater or less obtuseness, its centre of rotation was continually in the same horizontal plane, then the pendulum would accomplish its revolutions, whether great or small, with an equal speed, which speed would be exactly the same as that of an ordinary pendulum of the same length oscillating directly backwards and forwards.

2nd. The increase required in the length of the pendulum, to retain its centre of rotation in the same plane, when its inclination varies from any cause, is exactly in proportion to the result of two forces, viz., gravity and centrifugal force.

Considering these two laws in connection with the property possessed by helical springs of becoming lengthened in proportion to the weight they sustain, it will be seen that it is possible to apply them to the construction of a pendulum which shall be isochronous at all angles. In fact, if, instead of suspending the weight or bob to a rod of a fixed length, it were suspended to a spiral spring, the lengthening property of which should be proportional to the increase in the forces before mentioned, the centre of rotation of the pendulum would always remain in the same plane, and isochronism would be ensured, whatever change might occur in the angles of the cone generated by the rotation of the pendulum. These principles (which may be verified by theory) being laid down, it only remained to carry them into practice. On the one hand, in order that the spring may lengthen in proportion to the increase of the two forces, it must be sufficiently strong to sustain the weight of the bob, when in a state of rest, so as to preserve the original length of the pendulum. On the other hand, it is necessary to avoid all obstacles to the lengthening or shortening movements, which may be produced by variation in the length of the pendulum,—as the least friction would prevent the bob from arriving at the height required by the tension of the springs.

M. Pecqueur considered he had overcome these practical difficulties, by the arrangement of parts shewn in the model, which he submitted to the Academy of Sciences. This model is composed of the following parts;—1st, a Cardan suspension; 2nd, a rigid rod, which projects beyond the bob a distance sufficient to allow the pendulum to describe the largest cones, under the corresponding increase in the length of the springs; 3rd, a spherical bob, through the middle of which a cylindrical space is cut, in a direction parallel to the rod; 4th, four helical springs of cast and tempered steel; 5th, a tube, which encloses the rod without touching it, and which, resting upon the double regulating nut, placed at the bottom of the rod, rises to the height of the centre of suspension: the upper end of this tube carries a small cross piece in its centre, to the ends of which one of the pairs of helical springs is suspended. 6th, a second tube, enclosing the above-mentioned one without touching it. This tube is about the same length as a simple pendulum, which would oscillate twice while the rotating pendulum makes an entire revolution. This latter tube is furnished, at each end, with a small cross piece, similar to that above mentioned; the lower one being suspended to the first pair of springs, and the upper one supporting the second pair of springs, beneath which the bob is suspended.

By this arrangement, it will be seen that friction is avoided, and that the two pairs of springs, by their mutual expansion, effect the desired object. It will also be understood, that if the two tubes are formed of a substance more ready of expansion than the rod, they will, in a certain degree, compensate for changes of temperature: this compensation need not be made perfect for experiments of short duration; but, by attentively studying the working of the apparatus, it may always be rendered perfect, when it is desired to apply the rotating pendulum to time-pieces. It will be sufficient to observe, that in an apparatus, not very carefully constructed, the gain or loss, owing to variation of temperature, is so slight, that it is of no consequence in ordinary application.

M. Pecqueur has satisfied himself, by experiment, of the satisfactory working of this regulating pendulum, when it describes a cone varying in its angle between five and sixty degrees; the motive force itself varying from one to thirty at least.—[*Comptes Rendus.*]

ON THE STATE OF IDIO-ELECTRIC BODIES IN CONTACT WITH ELECTRIFIED CONDUCTING BODIES.

BY M. MATTEUCCI.

THE memoir, of which I now submit an extract to the Academy of Sciences (Paris), contains a long series of experiments, which I undertook for the purpose of ascertaining the state of insulating bodies, whether gaseous, liquid, or solid, in contact with an electrified conducting body.

It is impossible, in this extract, to describe the apparatus and processes which I employed; I will therefore confine myself to a description of the principal results which I have obtained. The memoir is divided into two parts—that relating to gaseous bodies, and the same bodies in a solid state. I will here confine myself to the gaseous bodies.

1st. The loss sustained in the electric state of an electrified conducting body, surrounded by a dry gas, is less, if that gas is in motion round that body, than when it is in a state of repose. This may be proved, either by agitating the body in the gas, or by renewing the gas which surrounds it.

2ndly. The loss of electricity by the gas is greater in a conducting body, when in presence of a similar body, equally electrified, than if alone; the least possible loss takes place when the body is in presence of another charged with contrary electricity, and at a distance at which the discharge cannot take place.

3rdly. I have very carefully studied the loss of electricity in perfectly dry gases. This loss is not the same in all gases: the fraction which expresses this loss, during a minute, is less for hydrogen gas than for air and carbonic acid. In air perfectly dry Coulomb's law is approximately correct; that is to say, the loss is in proportion to the electric density. Coulomb's other law, which declares the loss of electric force to be proportional to the cube of the quantity of water contained in the air, ceases to be true when the limits studied by Coulomb are exceeded; it is correct when Saussure's hygrometer marks from 65 to 70 degrees. In a drier air this ceases to be the case; thus the number which expresses the loss in perfectly dry air corresponds to air which, according to Coulomb's laws, would be very damp, and which would mark from 35 to 40 degrees.

4thly. In relation to dry air and gases, I have considered the influence of temperature; this study cannot be pushed very far, on account of the conductibility acquired by gum-lac or sulphur at 25 or 30 degrees centigrades. By operating at from 10 to 20 degrees, it is proved, beyond dispute, that air and gases lose their insulating power by being heated, in a much greater degree than would be imagined from an observation of the expansion of those bodies.

5thly. I have verified and extended to a large number of insulating bodies a fact discovered by Coulomb, with regard to gum-lac, viz., that the loss of electricity sustained in dry air is the same for an insulating as for a conducting body.

6thly. I have very carefully studied the losses of positive and negative electricity. In very slight charges there was no perceptible difference in loss between the two; but with stronger charges the difference was very manifest—negative electricity being more easily dispersed than positive. It will be seen, from the other parts of this memoir, that this result is also verified when the insulating body, which carries off the electricity, is solid.

7thly. I have also studied, as widely as possible, the influence of the density of the air on the loss of electricity; and also a subject which has not hitherto had light thrown upon it, viz., the cause and effect of vacuum in electrical phenomena.—I am in hopes this has been fully explained by my experiments.

A conducting body, on being charged with electric fluid, will hold a very different charge according to the density of the gas by which it is surrounded; the charge which it will contain is always the limited charge, which, consequently, gives the amount of resistance offered by the gas to the discharge, according to its density. From this it may be concluded that in a perfect vacuum no body could be charged, as the induction and discharge would take place at the same time.

In a gas of a certain density the gradual loss is less in proportion as the density is less. Thus in air at a pressure of one-tenth of an inch, exceedingly weak charges are obtained; but they will remain unchanged during several days.

8thly. On adding vapours of a different nature to steam to the gas, different degrees of loss are occasioned, according to the nature of those vapours. For instance, the loss occasioned by the vapour of sulphuric ether is very different from that caused by steam.

9thly. A certain time is requisite to allow the electricity to pass through the molecules of the gas, and come in contact with the electrified body; once passed, the molecules are separated, which is proved by the fact, that no permanent charge will exist when the gas is employed to prevent the escape of the electricity.

10thly. A stratum of air or gas, charged with contrary electricity, is first formed round the electrified body, and the gradual loss consists in the discharge which takes place from the molecules of the electrical stratum and the molecules of air in contact therewith: this discharge is different from the electric spark, in which all the electricity from the conducting body is concentrated to one point before being discharged.—[*Ibid.*]

Report made by M. Gaultier de Claubry, in the name of the Committee of Chemical Arts, on a Work, by M. Camus, intituled—

THE ART OF TEMPERING IRON AND STEEL.

IF long experience be desirable in any of the arts, it is most especially so in the tempering of steel; in fact, the different natures of the steel operated upon, and the still greater difference in the articles tempered, are obstacles which have hitherto prevented the promulgation of any general principle; in consequence of which, a good hand at tempering is held in great estimation. Placed for a length of time at the head of large establishments, and having, by praiseworthy perseverance, surmounted all kinds of difficulties, M. Camus has succeeded in collecting such information as will guide the workmen in the choice of the steel for any particular purpose, to judge of its qualities or defects, and to give it the requisite degree of temper. He has combined all these desiderata in a manual which he has presented to the Society.

It was difficult to write a work like that undertaken by M. Camus; for, if it were of too scientific a nature, it would be unintelligible to many of those for whom it was intended; if not sufficiently detailed, it would be useless. M. Camus has, therefore, pursued a course which appears the most rational and agreeable to general experience.

Notwithstanding the experience of the workman, it is impossible for his furnace to produce continually the same result; M. Camus has, therefore, sought the means of determining an uniform result; and this is one of the most interesting parts of his work. To obtain this, the author makes use of a register, by means of which he can regulate at pleasure the amount of draft from the bellows, the action of which was very inadequately regulated; and he divides the scale of his regulator into hundredths, which he calls *centifeux;* so that, in order to obtain a given result, it is only necessary to indicate the number which has reference to the production of a particular kind of steel.

The observations made by M. Camus, on the various degrees of heat to be given to the steel, according to its nature, the object to be obtained, and the form and dimensions of the pieces, are especially worthy of attention: the instructions he gives for the formation of the fagots, and the manner of tempering, are very clearly defined. The reporter of your committee had an opportunity of verifying many of them, when engaged in the manufacture of steel and files; and he thinks it will perhaps be useful to observe here that, amongst the products which procured him, at the exposition of 1827, the reward of a silver medal, many had been obtained under conditions analogous to those so clearly explained by M. Camus, but which were then, and would be now, without the assistance of this interesting work, secrets of the workshop.

The difficulties which the author had to surmount, will not, therefore, be a matter of surprise, nor the danger he has run, from the coalition of the workmen, on seeing the secrets divulged, from which they derived their superiority; and he deserves much praise for the perseverance with which he carried out his plan.

We will say nothing of the literary part of the work;—it is merely in a manufacturing point of view that we consider it: the manner in which it is written offers to the workman every facility to learn what is necessary for his work. M. Camus's book is a veritable manual, in the true acceptation of the word; with its assistance, the workman, without quitting his forge, or bellows, or hammer, may, while working, verify the utility and application of the author's precepts. There are few books, of which it may be said, as of this, that it will be useful both to the manufacturer and to the workman, and that the application of the instructions which it contains will produce real and important advantages in the manufacture.

M. Camus supposes himself in communication with a workman, who, hammer in hand, is about to submit to the required operations divers kinds of steel, and observes, with attention, the appearance of the action of the fire on the bodies he is working, and also the action of forging, and the construction of the different tools which serve to shape the articles he is manufacturing; and if engaged in tempering the peculiarities of the various liquids employed, and the scouring, &c., he shews him, as he proceeds, the points to which his attention is to be directed; and we do not doubt that if the workman is gifted with common intelligence, and carefully follows the instructions, in a very short time he will have acquired a great deal of valuable practical information.

Every body is aware of the difficulty of tempering articles of certain shapes without their bending;—in tempering files this causes very great inconvenience, for articles of an excellent temper have frequently to be either thrown away or sold at a very reduced price. M. Camus employs a press, for the purpose of straightening pieces thus bent, and clearly points out the means of applying it, thereby rendering great service to manufacturers of files.

In quick tempering, the manufacturers and workmen have a quantity of receipts, which they conceal with the greatest care: arsenious acid often figures in them; and for this M. Camus has substituted cyano-ferruret of potassium (prussiate of potass), the useful effects of which are now known, and which also remained as secrets, for some time, in the possession of workmen, who derived great advantage from them.

It would occupy too much of our space to enter in detail into all that is important and practical in M. Camus's book; we will therefore conclude by saying, that in all the stages of the manufacture of steel, the author has made known some facts which will be extremely useful in several of our most important manufactures.

In order to complete what has been so happily commenced, he ought to be persuaded to publish the facts which he has collected relative to the manufacture of steel intended for the manufacture of files; he will thus complete a body of information for the workshop deserving particular attention. We are in hopes that this example will be followed in other branches of industry.—[*Bulletin de la Société d'Encouragement.*]

[From the above impartial review of M. Camus's work,* it would seem that we have at last an opportunity of diving into the mysteries of manufacturing and tempering steel. It is somewhat of a marvel that in this country, which is famed for its hardware manufactures, we should in a great degree be dependent on the secret knowledge of our artificers, who, like the head professors of the culinary art, among our Gallic neighbours, can administer or withold the charm which renders valuable the labors of others, and can command any price for their professional assistance. Now this mode of carrying on any branch of the manufacturing arts, we hold to be very detrimental to the improvement of the art itself; for, instead of advancing on the accumulated knowledge and experience of the many, each improver is drawing merely from his own resources; and perhaps, in too many cases, the workman is fully satisfied with his present acquirements. If, then, it should be found that in the work of M. Camus such an amount of information is brought together as will form a basis on which an experimenter may safely rely, it will be obvious, that a great boon is communicated to the world; and from the infrequency of such a gift, so should it be valued. We would fain hope that the appearance of this work may prove a spur to the publication of the experience of others, not only in this, but in other branches of the manufactures,—as in dyeing, for instance,—for if knowledge is power, its absence must be weakness; and if our superiority over other countries in the working of iron and steel is adopted as an argument in favor of secret and isolated experience, it may be replied, that our success, in this particular, is rather from the natural advantages we possess, than from our superior ingenuity and skill. In other branches of the manufacturing arts, where practical knowledge is hoarded up, and where nature has not favored us beyond other nations, we find the costly experiments of isolated interests giving way to the knowledge which it is considered the duty of foreign governments to diffuse among their subjects; and thus, from a jealous care to hide all information from their near neighbours, English manufacturers frequently find themselves unable to compete, even in their own markets, with foreign produce.]

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* 1 Vol., 8vo., Mathias, Quai Malaquais, Paris.

ON THE DETECTION OF COTTON IN LINEN.

BY M. KINDT.

The ingenuity which competition in our textile manufactures continually elicits is now too frequently directed to the production of a deceptive and fugitive appearance in goods, instead of the real improvement of the fabric. It is therefore desirable that the consumer, who is well pleased with the reduced cost of his goods, should be able to ascertain where the economy has been effected; or, in other words, what kind of fabric he has purchased. With the view of assisting him in this analysis, we gave, in Vol. XXX., a test, by M. Vincent, for ascertaining the presence of New Zealand flax in sail or other cloth; and, as a carrying out of the same idea, we now insert the experiments of M. Kindt (for which we are indebted to the Philosophical Journal), whereby the presence of cotton may be detected when combined with flax; and perhaps, at the present time, such a test may be the more required, as a recent invention for polishing thread, has enabled the manufacturer to produce that article, with very inferior materials, superior in gloss and apparent firmness to thread made of the best flax.

"This subject has frequently engaged the attention of commercial and scientific men; many experiments have been made, in order to detect cotton thread in linen; many processes have been recommended, but none have hitherto proved satisfactory. I was therefore much surprised when a stranger, a few weeks ago, showed me a sample of linen, from the one-half of which all the cotton filaments had been eaten away. He had obtained it in Hamburg, and asked me whether I could give him a process for effecting this purpose. Now since, as far as I am aware, nothing has been published on this subject, and it is of very general interest, I consider it a duty to communicate the results of my experiments. I had already observed, in experimenting with explosive cotton, flax, &c., that these two substances behave somewhat differently towards concentrated acids; and although it has long been known that strong sulphuric acid converts all vegetable fibre into gum, and when the action is continued for a longer period, into sugar, I found that cotton was metamorphosed much more rapidly by the sulphuric acid than flax. It is, therefore, by means of *concentrated sulphuric acid* that cotton may be removed from linen when mixed with it; and this object may be obtained by the following process:—

"The sample to be examined must be freed, as perfectly as possible, from all dressing, by repeated washing with hot rain or river-water, boiling for some length of time, and subsequent rinsing in the same water; and I may expressly observe, that its entire removal is requisite for the experiment to succeed. When it has been well dried, the sample is dipped for about half its length into common oil of vitriol, and kept there for about half a minute to two minutes, according to the strength of the tissue. The immersed portion is seen to become transparent. It is now placed in water, which dissolves out the gummy mass produced from the cotton; this solution may be expedited by a gentle rubbing with the fingers; but since it is not easy to remove the whole of the acid by repeated washing in fresh water, it is advisable to immerse the sample, for a few instants, in spirits of hartshorn (purified potash or soda have just the same effect), and then to wash it again with water. After it has been freed from the greater portion of the moisture, by gentle pressure between blotting-paper, it is dried. If it contained cotton, the cotton threads are found to be wanting in that portion which had been immersed in the acid; and by counting the threads of the two portions of the sample, its quantity may be very readily estimated.

"If the sample has been allowed to remain too long in sulphuric acid, the linen threads likewise become brittle, or even eaten away; if it were not left a sufficient time in it, only a portion of the cotton threads have been removed: to make this sample useful, it must be washed, dried, and the immersion in the acid repeated. When the tissue, under examination, consists of pure linen, the portion immersed in the acid likewise becomes transparent, but more slowly, and in a uniform manner; whereas, in the mixed textures, the cotton threads are already perfectly transparent, while the linen threads still continue white and opaque. The sulphuric acid acts upon the flax threads of pure linen, and the sample is even somewhat transparent, after drying, as far as the acid acted upon it; but all the threads in the sample can be seen in their whole course.

"Cotton stuffs, containing no linen, dissolve quickly and entirely in the acid; or, if left but one instant in it, become so brittle and gummy, that no one will fail to recognise it as cotton, when treated in the above manner.

REPORT OF AMERICAN PATENTS.

From the "Journal of the Franklin Institute."

BY MR. C. M. KELLER.

To ALLEN JUDD, *of Cabotsville, Massachusetts, for an improvement in the windmill.*

THIS invention consists in placing the vanes around a vertical shaft, and at a distance therefrom, and arranged with their planes tangential to the inner circumference of the rims of the wheel to which they are attached, or to some circle of less diameter, with sufficient space between each for the passage of the wind, which enters the wheel from below, and acts on the inner surfaces of all the vanes and passes out; the wheel being surrounded with two series of shutters or blinds, one series below a floor which is on a level with the lower open rim of the wheel, and the other series above this floor, the former being thrown open on the side towards the wind, by which it enters the wheel, and those of the upper story thrown open on the other side, for the escape of the wind after it has acted on the wheel.

The patentee claims a wheel, substantially such as is herein described, having one end open for the admission of the wind, in combination with a surrounding casing, divided into two compartments, and composed of shutters,—one of the compartments to admit the wind to the inside of the wheel, and the other to permit its escape,—all substantially as herein described.

To JOEL R. MORSE, *of Boston, Massachusetts, for a machine for cutting shell or horn.*

AFTER the shell or horn has been properly softened, it is put on to a carriage, which brings it against the edge of a knife, by which it is reduced to the required thickness; and to hold it on to the carriage, with the face in contact therewith (notwithstanding the inequalities thereof) a thin flexible plate of metal, attached to the carriage, is placed over the shell or horn, and over this another thin plate of metal, which does not move; and this last plate is borne down by a series of vertical pressers, forced down, each by a separate spring, to act on the unequal surface of the shell or horn, and thus make one surface level with the surface of the carriage, so that the knife shall only shave off the surplus thickness.

To WM. S. MC LEAN, *of Allegheny, Pennsylvania, for an improvement in the sash fastener.*

A COG-WHEEL is placed in the window-frame, so as to act on the sash, and on the arber of this wheel there is a ratchet-wheel, the teeth of which, on the face of the cog-wheel, receive a spring-catch; and the ratchet-wheel is prevented from turning too freely by a friction-spring; so that when the cog-wheel is unlocked, by withdrawing a spring-bolt, the sash can be moved up or down, the friction-spring on the periphery of the ratchet-wheel being sufficient to hold the sash in any desired position.

The patentee claims the combination of the cog-wheel, friction ratchet-wheel, friction-spring and lock-bolt, as applied to a window-sash, in the manner described.

To DANIEL ASBURY, *of Coburus, P.O., Union County, North Carolina, for an improved apparatus for washing and amalgamating gold and silver.*

THE patentee says:—"By the ordinary and common processes for the separation of gold and silver from their ores, by washing with water and amalgamation with mercury, there has always been a loss of both gold and silver, as well as of the mercury. In the hand rocker and long semi-circular trough, usually worked by hand, the quantity of sand and gravel which these machines can work is small; consequently, when that contains but little gold, or platinum, it cannot be worked with profit; and in these machines there is a great loss of both gold and platinum, as well as quicksilver (when that is used), because the motion is half the time in one direction, and half the time in the other; by which the gold, &c., is prevented from subsiding, and consequently passes off with the water and sand. In the Burke rocker, there is a still greater waste of quicksilver and the precious metals. In the Tyrolese bowls, the sand and gravel subside too soon to the bottom, and prevent the contact of the gold and silver with the quicksilver. My machine, I believe, will obviate all these practical evils, which, heretofore, have attended the extraction of the precious metals from their ores, or earthy and stony mixtures. These objects I effect in the following way:—"The moving frame, which supports the pans, is hung to two cranks on two shafts, one at each end, by the rotation of which the required shaking motion, such as would be given by hand, is obtained."

"What I claim as my invention is the moving frame supporting one or more pans, and moved by cranks, or other analogous device, causing them to be shaken, in the manner and for the purpose above set forth."

To ROBERT FREDERICK *and* G. A. TRUMP, *of Baltimore, Maryland, for an apparatus for preserving corpses.*

THE patentees say:—"Various devices have from time to time been essayed for preserving bodies after death, by the application of ice; but where applied directly to the body it was troublesome and ineffectual, wetting it, and thereby rendering it more subject to decomposition. Another process has been, to place the body in a coffin-shaped case, the said case being surrounded with ice; but this method is objectionable, on account of the space that must intervene between the ice and those parts of the body most desirable to congeal. Experience has proved that it is only necessary to freeze the trunk or abdomen, and the chest; but no apparatus has heretofore been made that would, with any degree of certainty, effect this object on all sized persons, without an immense expenditure of ice, owing to the difficulty of bringing the reservoir containing the ice in contact with the proper parts. By our invention we effect this,—and, with a very small quantity of ice, we freeze the corpse as much as is necessary, while, at the same time, our apparatus is portable and convenient.

"What we claim as our invention, and desire to secure by letters patent, is a reservoir for containing ice, having a bottom formed to fit the corpse, so that it can be placed in contact with it for the purpose described."

To J. Shaler Ives, *of New York City, New York, for an improvement in the method of tuning the metallic reeds of seraphinas, accordions, &c.*

The patentee says :—"The object of my improvement is to simplify and cheapen the construction, and to provide means for the adjustment of the reeds, to make them 'speak.' These ends I attain by making the reeds, which are attached to the bottom of their appropriate plates, to spring up through the apertures in which they vibrate ; so that, by the application of an adjustable pressure above them, their plane can be regulated relatively to the apertures with the greatest nicety, to insure their speaking and giving out the best tones,—the vibration being insured for a good tone by the pressure of the spring of the reed against the presser." The following are the patentee's claims :—

"I claim as my invention the tuning of metallic reeds that vibrate within the apertures for the passage of the wind, by means of adjustable pressers that act against the spring of the reeds, substantially as described.

"I also claim making the slide with the parallel spring bars or branches, substantially as described, to insure the working of the slide without being affected by the vibration of the reed, as described.

"And I also claim making the pressure on the top of the reed, by an adjusting screw, or other analogous device, to regulate the speaking of the reed, as described."

To Philos B. Tyler, *of New Orleans, Louisiana, for improvements in railroad switches.*

The patentee says :—"The nature of my invention consists in constructing the moveable part of the switch with an additional branch rail, between which and the true switch, there is an inclined plane and a guard on the outside ; so that when the switch is set wrong, the carriages cannot run off the track."

The patentee claims constructing the switch, as herein described ; that is to say, the addition of the branch to the main rail, with the inclined plane for the flanch of the wheel to run upon between them ; and, in combination therewith, the short rails and guard, arranged substantially in the manner and for the purpose above set forth.

LIST OF REGISTRATIONS EFFECTED UNDER THE ACT FOR PROTECTING NEW AND ORIGINAL DESIGNS FOR ARTICLES OF UTILITY.

1847.

Aug. 30. *Abram & Charles Seward*, of Lancaster, brass-founders, for a hot-air furnace for warming buildings.

Sep. 1. *William Smith*, of Gresham-street, London, for a tray for holding pins and needles.

1. *Jacob Lyons*, of 11, Wilson-street, Finsbury-square, London, for the Royal Cambridge coat.

3. *Smith & English*, of 69, Princes-street, Haymarket, engineers, for a spanner or wrench.

3. *Richard Farrar*, of 25, Great Russell-street, Covent-garden, draper, &c., for an office invoice, letter, and leaf binder.

4. *John Baldwin Wheeler & John Lee Ablett*, of 23, Poultry, city of London, for the "salatium" stocking or sock.

6. *Thomas Shutt Stock*, of Birmingham, for an improved garden or fire-engine.

6. *William Staite*, of Radford Semele, near Leamington, Warwickshire, for an improved surface or skim-plough.

7. *Joseph Fenn*, of 105, Newgate-street, tool-manufacturer, for an excentric lever brace.

9. *Henry Jones*, of Rose-street, Covent-garden, London, for an air regulator.

9. *Bartholomew Brittain*, of 149, Waterloo Bridge-road, London, for a bracket for French bedsteads.

9. *William Samuel Burton*, of 39, Oxford-street, London, ironmonger, for a collapsable sponging bath.

9. *William Samuel Burton*, of 39, Oxford-street, ironmonger, for a collapsable shower bath.

10. *Swain & Co.*, of 379, Oxford-street, court tailors, for the registered Syrian paletot.

11. *James Dixon & Sons*, of Cornish-place, Sheffield, for a dish-cover.

14. *Henry Thompson*, of Long Acre, London, for a portable folding rocking chair.

16. *George Chambers*, of Priory Needle Mills, Studley, Warwickshire, for a needle guage.

Sep. 17. *Philip Warbleton*, of Upper Hallam, near Sheffield, for a razor blade.

17. *Dean John Heane*, of Greenwich, for a railway telegraph and alarum.

17. *James Lewis*, of Stamford-hill, Middlesex, horticultural builder, for an improved Polmaise stove.

18. *William Wilson*, of King-street, Manchester, for a hot-water cistern for baths, &c.

20. *Dawbarn & Son*, of 110, Bold-street, Liverpool, for the back piece of a frock or dress coat.

22. *John Simmons*, of Birmingham, for an hydraulic jack.

23. *George Paul & Henry Fletcher*, of 128, New-Bond-street, military tailors, for the "pallagallica," or long-sided coat.

25. *William Dovey & Son*, of Shoe-lane, London, brass-founders, for a tap or cock.

27. *Eugene Boileau*, of Grove-road, Mile-End, for Boileau's calligraphic type.

27. *John Moore Hyde*, of Bristol, optician and instrument maker, for a submarine communicator.

27. *David Moseley*, of Chorlton-cum-Medlock, Manchester, machine maker, for a machine for lapping card fillets upon the cylinders, and in carding cotton and other fibrous substances.

List of Patents

That have passed the Great Seal of IRELAND, from the 17th August to the 17th September, 1847, inclusive.

To John Wood, of Leeds, in the county of York, machine-maker, for certain improvements in machinery for spinning fibrous substances.—Sealed 21st August.

William Edward Newton, of the Office for Patents, 66, Chancery-lane, London, in the county of Middlesex, civil engineer, for certain improvements in the manufacture of screws,—being a foreign communication.—Sealed 28th August.

Paul Gilbert Prelier, of Rue de Rivoli, Paris, in the Kingdom of France, Gent., for improvements in the manufacture of dry sulphuric acid, and in the manufacture of smoking or Nordhausen sulphuric acid,—being a foreign communication.—Sealed 1st September.

Alexander Mitchell, of Brickfield, in the parish of Ballymacarret, in the county of Down, civil engineer, for a certain invention of a dock, of improved construction, to facilitate the repairing, building, or retaining of ships and other floating vessels; certain parts, employed in the construction of the said dock, being also applicable to other purposes,—being an extension of his patent, granted by his Majesty King William the Fourth, bearing date the 18th day of September, in the fourth year of his reign, under the Great Seal of Ireland.—Sealed 8th September.

John Lane, of Oriel-street, Liverpool, brewer, for improvements in railway carriages and engines.—Sealed 8th September.

List of Patents

Granted for SCOTLAND, subsequent to August 22nd, 1847.

To John Blyth and Alfred Blyth, both of St. Ann's, Limehouse, in the county of Middlesex, engineers, and John McCulloch, of Masemore Cottages, Old Kent-road, in the county of Surrey, chemist, for certain improvements in apparatus for distilling and rectifying.—Sealed 23rd August.

Stephen White, of No. 30, Winchester-row, New-road, in the parish of Marylebone, in the county of Middlesex, clerk in the employ of the Great Western Railway Company, for a new means of producing gas, both as to apparatus and materials from which the gas is produced.—Sealed 25th August.

Charles Hancock, of Brompton, in the county of Middlesex, Gent., for improvements in the preparation of gutta-percha, and in the application thereof, alone, and in combination with other materials, to manufacturing purposes; which improvements are also applicable to other substances.—Sealed 26th August.

Pierre Armand le Comte de Fontainemoreau, of No. 4, South-street, Finsbury, London, for certain improvements in steam and other engines,—being a foreign communication.—Sealed 31st August.

Edward Manlove, of Nottingham-park, in the county of Nottingham, Gent., for certain improvements in propelling,—being a communication.—Sealed 31st August.

William Pidding, of Alfred-place, Bedford-square, in the county of Middlesex, Gent., for an improved process, or improved processes, for preparing certain vegetable extracts; and also for preserving the aroma of certain vegetable substances from the atmosphere.—Sealed 1st September.

Charles Chinnock, of Seymour-place, Little Chelsea, in the county of Middlesex, Gent., for improvements in regulating motion and controlling friction in the joints and other parts of furniture, machinery, and carriages.—Sealed 5th September.

Arthur Harry Johnson, of Gresham-street, in the city of London, assayer, for improvements in refining silver lead, by effecting a saving in one of the materials used.—Sealed 6th September.

Jules Jean Baptiste Martin de Lignac, of Portland-street, in the county of Middlesex, Gent., for improvements in preserving milk.—Sealed 8th September.

Pierre Armand le Comte de Fontainmoreau, of No. 4, South-street, Finsbury, for certain improvements in machinery for preparing cotton and other fibrous substances,—being a foreign communication.—Sealed 13th September.

Baron Charles Wetterstedt, of Rhodes Hill-road, Limehouse, in the county of Middlesex, for improvements in the manufacture of sheet-metal for sheathing and other purposes, in preventing the corrosion of metal, and in preserving wood and other materials.—Sealed 15th September.

William Bacon and Thomas Dixon, both of Bury, in the county of Lancaster, engineers, for certain improvements in steam-engines.—Sealed 17th September.

Kasimir Vogel, of St. Paul's Church-yard, London, Gent., for a new manufacture of weavers' harness, and machinery for the production of the same.—Sealed 17th September.

Robert Wilson, of Low Moor Iron Works, Bradford, in the county of York, engineer, for certain improvements in machinery, and arrangements thereof, for forging, stamping, punching, cutting, and pressing metals and other substances.—Sealed 17th September.

John Mollett, of Austin Friars-passage, in the city of London, merchant, for certain improvements in fire-arms and in cartridges,—being a communication.—Sealed 21st September.

New Patents

SEALED IN ENGLAND.

1847.

To Charles Chabot, of Skinner-street, Snow-hill, London, zincographer and engraver, for improvements in railway carriages, and in the buffers and other apparatus connected with such carriages. Sealed 2nd September—6 months for inrolment.

Robert Oxland, of Plymouth, chemist, for improvements in dyeing, parts of which improvements are applicable to the manufacture of metallic alloys. Sealed 2nd September—6 months for inrolment.

William Sykes Ward, of Leeds, Gent., for improvements in communicating motive power,—which are applicable to working signals and breaks on railways; and also improvements in communicating intelligence, signals, and motive power, by the agency of voltaic electricity. Sealed 2nd September—6 months for inrolment.

Thomas Forster, of Streatham, Surrey, manufacturer, for improvements in machinery for cutting India-rubber, in rendering fabrics waterproof, and in making articles from fabrics so rendered waterproof, and in dissolving India-rubber and other gums. Sealed 2nd September—6 months for inrolment.

Henry Davy, of Ottery, Saint Mary, in the county of Devon, Gent., for improvements in separating copper and other metals from their ores,—being a communication. Sealed 2nd September—6 months for inrolment.

Richard Madigan, of Haverstock-hill, Middlesex, civil engineer, for certain improvements in railway turn-tables. Sealed 2nd September—6 months for inrolment.

John Mitchell Rose, of the Firm of Rudall and Rose, Tavistock-street, Covent-garden, musical instrument maker, for certain improvements in flutes, clarionets, and other similar wind instruments,—being partly a communication. Sealed 6th September—6 months for inrolment.

Henry Vint, of Saint Mary's Lodge, Colchester, Gent., for improvements in propelling ships and other vessels. Sealed 6th September—6 months for inrolment.

John Barke Gustavus Ferryman, of Cheltenham, Gloucestershire, Gent., for certain improvements in handles to be applied to various articles for containing liquids or other matters liable to be spilt. Sealed 6th September—6 months for inrolment.

James Leadbetter, of Over Darwen, in the county of Lancaster, brazier, and William Pierce, of the same place, mechanic, for certain improvements in machinery or apparatus for raising water and other fluids. Sealed 6th September—6 months for inrolment.

Thomas Marsden, of Salford, Lancaster, machine-maker, for improvements in machinery for dressing or combing flax, wool, and other fibrous substances. Sealed 6th September—6 months for inrolment.

Joseph Clinton Robertson, of Fleet-street, civil engineer, for certain improvements in the manufacture of metals from their ores,—being a communication. Sealed 9th September—6 months for inrolment.

James Sims, of Redruth, in the county of Cornwall, civil engineer, for certain improvements in steam-engines. Sealed 9th September—6 months for inrolment.

William Gibbons, of Corbyn's Hall, near Dudley, Worcestershire, for certain improvements in trussing beams and girders. Sealed 9th September—6 months for inrolment.

Thomas Battye, of Woburn-place, Middlesex, Gent., for an improved mode of retaining the waist of the human body in a desirable form, without producing the inconvenience resulting from too tight lacing of stays or corsets, or buckling of belts, waistbands, or girdles. Sealed 9th September—6 months for inrolment.

John Blyth and Alfred Blyth, both of St. Ann's, Limehouse, Middlesex, engineers, and John Mc Culloch, of Masemore Cottages, Old Kent-road, Surrey, chemist, for certain improvements in apparatus for distilling and rectifying. Sealed 9th September—6 months for inrolment.

Frederick Steiner, of Hyndburn Cottage, near Accrington, Lancashire, Turkey-red dyer, for improvements in the manufacture of sugar. Sealed 9th September—6 months for inrolment.

Connor William O'Leary, of Tralee, in the county of Kerry, Ireland, for certain improvements in the methods of producing power for the discharge of weapons and missiles, and other purposes. Sealed 9th September—6 months for inrolment.

William Brockedon, of Devonshire-street, Queen-square, Middlesex, Gent., for improvements in heating rooms or apartments. Sealed 9th September—6 months for inrolment.

Clemence Augustus Kurtz, of Manchester, manufacturing chemist, for certain improvements in the mode of preparing and using indigo in the dyeing and printing of woollen, cotton, and other fabrics. Sealed 9th September—6 months for inrolment.

James Pitt, of Cheyne-walk, Chelsea, Gent., for improvements in apparatus for holding down trousers. Sealed 9th September —6 months for inrolment.

David Morgan, of Morriston, Glamorgan, coppersmith, and John Borlase Jenkins, of Middle-bank, in the same county, copper agent, for certain improvements in the manufacture of copper and other metal cylinders or rollers for the printing of silks and other fabrics, and for other similar purposes; and in casting copper and other metal cylinders, tubes, or rollers, hollow, and free from air bubbles. Sealed 9th September—6 months for inrolment.

William Hancock, of Pentonville, in the county of Middlesex, Gent., for certain improvements in bolts, locks, and other fastenings. Sealed 16th September—6 months for inrolment.

George Bell, of the city of Dublin, merchant, for improvements in gas-tar; by means of which improvements it may be used as a substitute for oil-paint; and which he intends to designate patent mineral paint. Sealed 23rd September—6 months for inrolment.

John Dickinson, of 65, Old Bailey, stationer, for certain improvements in the manufacture of paper. Sealed 23rd September—6 months for inrolment.

Arthur Harty Johnson, of Gresham-street, City, assayer, for improvements in refining silver lead, by effecting a saving in one of the materials used. Sealed 23rd September—6 months for inrolment.

Henry Newton, of Litton Mill, Bakewell, Derby, cotton-spinner, for improvements in spinning and doubling cotton and other fibrous substances. Sealed 23rd September—6 months for inrolment.

Charles Hancock, of Brompton, in the county of Middlesex, for improvements in the preparation of gutta-percha, and in the application thereof, alone, and in combination with other materials, to various manufacturing purposes. Sealed 24th September—6 months for inrolment.

CELESTIAL PHENOMENA FOR OCTOBER, 1847.

D.	H.	M.	
1			Clock after the ☉ 10m. 11s.
			☽ rises 10h. 56m. A.
			☽ passes mer. 5h. 50m.
			☽ sets 1h. 38m. A.
	7	36	☽ in □ or last quarter
	17	48	♃ in conj. with the ☽ diff. of dec. 5. 15. N.
			Occul. λ Geminorum, im. 11h. 26m.
2	12	26	♃'s third sat. will em.
3	4	10	♀ in inf. conj. with the ☉
4			Occul. π Leonis, im. 17h. 43m. em. 18h. 34m.
4	11	41	☿ in the descending node
4	14	48	♃'s first sat. will im.
5			Clock after the ☉ 11m. 25s.
—			☽ rises 2h. 2m. M.
—			☽ passes mer. 9h. 2m. M.
—			☽ sets 3h. 52m. A.
6	1	32	Juno in □ with the ☉
7	21	44	♀ in conj. with the ☽ diff. of dec. 7. 33. N.
8			An annular eclipse of the ☉
	6	14	Partial phase begins
	7	26	Annular phase begins
	7	27′ 3	Greatest phase
	7	27′ 9	Annular phase ends
	8	48	Partial phase ends
			Magnitude of the eclipse (sun's diameter = 1) 0·919 on the southern limb
8	5	0	☽ in Apogee
9	9	7	Ecliptic conj. or ● new moon
	13	23	♃'s first sat. will im.
	16	25	♃'s third sat. will em.
9	17	3	♅ in oppo. to the ☉
10			Clock after the ☉ 12m. 50s.
—			☽ rises 7h. 14m. M.
—			☽ passes mer. 0h. 36m. A.
—			☽ sets 5h. 51m. A.
	2	17	☿ in conj. with the ☽ diff. of dec 2. 38. S.
11	13	38	♃' second sat. will im.
11	16	42	♃'s first sat. will im.
12	23	51	♃ in □ with the ☉
13	11	10	♃'s first sat. will im.
14	15	22	☿ in Aphelion
15			Clock after the sun 14m. 2s.
—			☽ rises 0h. 6m. A.
—			☽ passes mer. 4h. 34m. A.
—			☽ sets 9h. 4m. A.
16			Occul. p1, Sagittarii im. 9h. 56m.
16			Mercury R. A. 14h. 27m. dec. 15. 57. S.
—			Venus R.A. 12h. 2m. dec. 6.38. S.

D.	H.	M.	
16			Mars R. A. 2h. 41m. dec. 13. 40. N.
—			Vesta R. A. 15h. 51m. dec. 17. 38. S.
—			Juno R. A. 19h. 0m. dec. 13. 16. S.
—			Pallas R. A. 9h. 16m. dec. 10. 56. S.
—			Ceres R. A. 10h. 27m. dec. 17 23. N.
—			Jupiter R. A. 4h. 21m. dec. 20. 53. N.
—			Saturn R. A. 22h. 36m. dec. 10. 55. S.
—			Georg. R. A. 1h. 0m. dec. 5. 40. N.
—			Mercury passes mer. 0h. 49m.
—			Venus passes mer. 22h. 20m.
—			Mars passes mer. 13h. 1m.
—			Jupiter passes mer. 17h. 45m.
—			Saturn passes mer. 8h. 57m.
—			Georg. passes mer. 11h. 20m.
			♃'s third sat. will im.
17	7	41	☽ in □ or first quarter
18	1	22	♃ in the ascending node
	16	14	♃ second sat will im.
20			Clock after the sun 15m. 2s.
—			☽ rises 3h. 18m. A.
—			☽ passes mer. 9h. 0m. A.
—			☽ sets 1h. 34m. M.
	1	14	♄ in conj. with the ☽ diff. of dec. 6. 58 S.
	13	3	♃ first sat will im.
21	18	25	♀ stationary
22			Occul. e Piscium im. 14h. 31m.
22	13	14	♅ in conj. with the ☽ diff. of dec. 0. 8. S.
	20		☽ in Perigee
23	11	36	Ecliptic oppo. or ○ full moon
24	2	30	♂ in conj. with the ☽ diff. of dec. 1. 9. N.
25			Clock after the ☉ 15m. 45s.
—			☽ rises 6h. 7m. A.
—			☽ passes mer. 0h. 46m. M.
—			☽ sets 8h. 16m. M.
27	14	56	♃ first sat. will im.
28			Occul. 51 Geminorum, im. 18h. 37m.
29	4	30	♃ in conj. with the ☽ diff. of dec. 5. 13. N.
30			Occul. a^2 Cancri, im. 18h. 2m. em. 19h. 21m.
30	9	56	☽ in □ or last quarter
30	21	8	♂ in oppo. to the ☉

J. LEWTHWAITE, Rotherhithe

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RECENT PATENTS.

To HENRY FLETCHER, *of Over Darwen, in the county of Lancaster, manufacturer, for improvements in apparatus for ascertaining the distance which locomotive engines and carriages have travelled upon railways.*—[Sealed 10th March, 1847.]

THIS invention of apparatus for ascertaining the distance which locomotive engines and carriages have travelled upon railways may be applied to the locomotive engine or tender, in some convenient situation, where the engineer can readily have his eye upon it, or to any of the carriages, for the guidance of the guard or others: the object of the invention is to ensure more punctuality on railways. By the aid of this apparatus, the engineer will at all times be enabled to ascertain the speed of the engine, the distance to the next station, and his exact position on the line; which information is very useful at night or in foggy weather: a chronometer is also attached, which will shew the railway time. The apparatus will also register on paper a description of the journey; that is, the time occupied at each station during the journey, and the exact speed travelled during every mile;—this paper may be taken off at the end of each journey, and, when marked with the number of engine and the date of the year, it may be filed in the railway office. The apparatus has a dial, the circumference of which is divided into the number of miles on the railway; and all the stations are correctly marked down at the proper distances from each terminus. A finger or indicator points to that place on the dial occupied by the engine on the line of railway. There is also a small finger, which revolves once in two miles, by which the engineer can ascertain his speed. Another small finger, which revolves once in sixty journeys, or about ten thousand miles, is provided, for the purpose of ascertaining what distance the engine has performed during a considerable period, say ten weeks; and as many engineers are paid by mileage, all disputes as to the distance run during the week or fortnight, or other term for which they are to receive their wages, will be prevented. Within the apparatus the speed and distance is registered; and in order to effect this, a long strip of paper is previously marked with perpendicular lines, which represent miles, and with horizontal lines, which represent minutes; and it is so arranged, that one division of the perpendicular lines is wound on a cylinder when the engine has advanced one mile. Connected with the chronometer is an apparatus for moving a pencil, which marks the paper across one division of the horizontal lines in one minute of time; by this means (according to the perpendicular or diagonal mark on the paper) the stoppage and velocity of the engine can be precisely ascertained. This apparatus, which the patentee denominates the "*Itinerarium*," is moved by means of a separate wheel running on the rail, and is not affected by breaks, or slipping, &c.: it is placed in a convenient situation, so that the engineer may readily see it; and at night it is intended to be illuminated.

In Plate X., fig. 1, represents a front view of the apparatus, as calculated for the Manchester and Leeds Railway (merely by way of exemplification), consisting of sixty-one miles; fig. 2, is a vertical section; and fig. 3, a back view of the same, with the back-plate removed, in order more clearly to exhibit the working parts of the apparatus. Fig. 4, is a side view of a tender, drawn to a smaller scale, and shewing the method of applying the invention thereto. *a, a,* is the body of the tender; and *b, b,* are the ordinary running wheels. *c,* is a wheel, exactly ninety-nine inches in circumference, running upon the rail, and supported by the bearings *d, d.* *e,* is a crank, which is fixed upon the stud that carries the wheel *c,* and revolves with it. This crank is connected to the lever *f,* by the link *g.* The lever *f,* has its fulcrum at *h,* and carries a catch, which takes into a small ratchet-wheel (having sixteen teeth, and not seen in the drawing) at the back of the mitre-wheels *i, i,* which drive the upright shaft *k, k,* (see figs. 2, and 3,) by means of two spur-wheels *l, l,* having an equal number of teeth. Upon the shaft *k,* a worm *m,* is fixed, which takes up one tooth of a wheel *n,* at each revolution. This wheel *n,* has forty teeth; and upon the shaft which carries it another worm *o,* is fixed, taking up one tooth of the wheel *p,* at each revolution. The wheel *p,* has one hundred and twenty-two teeth, and is placed loosely upon the shaft *q,* but causes the said shaft to revolve by means of the spring *r,* pressing the wheel *p,* against a similar wheel *s,* which is fast upon the shaft *q.* This shaft *q,* carries at one end the long finger *t,* which points upon the dial-plate *u,* the exact position of the engine and tender upon the railway. For it will be evident, that as the wheel *c,* is exactly ninety-nine inches in circumference, and the ratchet-wheel aforesaid (not seen in the drawing) has sixteen teeth, and the worm-wheel *n,* has forty teeth, then 99 × 16 × 40, gives 63,360 inches, or one mile; and as the wheels *p,* and *s,* have each one hundred and twenty-two teeth, the finger *t,* will travel once round the dial-plate *u,* in one hundred and twenty-two miles, or one journey from Manchester to Leeds and back. Upon the boss of the wheel *p,* a pin *w,* is fixed, which takes up one tooth of the ratchet-wheel *x,* (having sixty teeth) at each revolution of the wheel *p;* and upon the pin which carries this ratchet-wheel the short finger *y,* is fixed, which travels round the small circle *z,* upon the dial-plate: the finger *y,* will therefore travel once round the circle *z,* in seven thousand three hundred and twenty miles, or sixty journeys from Manchester to Leeds and back. The wheel *s,* drives a pinion 1, having eight teeth, and fixed upon the same stud as the wheel 2, which has ninety-six teeth and takes into the pinion 3, of twelve teeth, to the axle of which pinion the short finger 4, which travels round the small circle 5, upon the dial-plate, is connected. Then as 96 ÷ 8 = 12, gives 1, the finger 4, will travel once round the circle 5, in one mile. By the use of this apparatus the engineer can always tell the exact position of the engine on the railway, and the distance to the next station he is approaching; and the chronometer shewing him the exact time, and his knowing also at what time he ought to be at each station, he will have sufficient data to be punctual; and by comparing the mile finger 4, with the seconds finger of the chronometer, and regulating his steam accordingly, he will be enabled to keep the engine at a more uniform speed.

The patentee does not bind himself to this particular plan of working the apparatus, but he claims the indicating of time, speed, and distance in one apparatus, with the object above specified.—[*Inrolled in the Petty Bag Office, September,* 1847.]

Specification drawn by Messrs. Newton & Son.

To JOHN WARBURTON, *of Kearsley, in the county of Lancaster, tin-smith, for his invention of certain improvements in machinery or apparatus for preparing, slubbing, and roving cotton, wool, and other fibrous materials.*—[Sealed 8th October, 1846.]

THIS invention applies solely to those machines which are commonly called "presser-frames," and more particularly to the part or parts of such machines called the "flyer." As many inventions have lately been practised wherein a great variety of novel modes of giving elasticity to that part of the flyer called the "presser" have been the subject of improvement, the patentee, for the sake of distinction, states, that his improvements apply to the old "presser-flyer," or to that in which the long tail-spring, attached at its upper end to the flyer-leg, is used. The invention consists, firstly, in a simple method of regulating the action of such spring, and also of applying the spring to the presser-lever, in such a manner, that when the bobbin is filled, and it is required to "doff" or remove it from the spindle, the presser can be readily shifted backwards, and caused to stand out of the way, whilst the attendant is doffing the bobbin, without the necessity of the presser being held back or kept off the bobbin by the hand of the attendant, as usual.

In Plate XI., fig. 1, represents a front view of a spindle and flyer, with the improvements applied thereto; fig. 2, is a sectional plan or horizontal view, taken at the line A, B, fig. 1; and fig. 3, is a similar view, taken at the line C, D, in the same figure. *a, a,* is the spindle; *b, b,* the flyer; *c, c,* the bobbin of rovings, &c.; and *d, d,* the tail-spring of the ordinary presser-frame. The improvements consist, firstly, in the application to one or both legs of the flyer, as the case may be, of the guide-piece *e,* with its inclined slot or opening, as seen best in fig. 2, for regulating the pressure of the tail-spring *d,* upon the presser *f*; and, secondly, in the employment or use of a small link *g,* or intermediate connecting-piece, for attaching the spring *d,* to the presser *f,* which, being allowed to swivel loosely at both ends, enables the presser *f,* to be pushed back, out of the way of the full bobbin whilst doffing, as shewn by dotted lines in fig. 3.

The patentee claims, Firstly,—with reference only to those machines used in the preparing, slubbing, and roving of cotton, and other fibrous materials, wherein the ordinary presser-flyers are used, the application or employment of the grooved guide-piece *e,* or other similar contrivance, for the purpose of regulating the action of the tail-spring *d,* upon the presser. And, Secondly,—the adaptation and use of the connecting-link *g,* or other similar contrivance, whereby the tail-spring is enabled to retain the presser *f,* in the required position whilst doffing, and also to impart the necessary elasticity to the presser.—[*Inrolled in the Petty Bag Office, April,* 1847.]

Specification drawn by Messrs. Newton and Son.

To Samuel Hardacre, *of Manchester, in the county of Lancaster, machinist, for certain improvements in machinery or apparatus for opening and for carding cotton and other fibrous substances, and for grinding the cards of carding-engines,—part of which improvements had become known to him whilst residing abroad.*—[Sealed 29th March, 1847.]

The first part of this invention relates to the machine for opening cotton and other fibrous substances, termed the willy or willow, and consists in constructing the same in the manner represented in Plate X.; fig. 1, being a vertical section of the machine; fig. 2, a plan view; and fig. 3, a section on the line A, B, of fig. 1. In this machine the revolving axis *f*, is placed in a vertical position in the centre of a cylindrical cage or grid *b*, composed of a series of upright triangular iron bars, and the bottom *c*, of which is also a grid, formed of horizontal triangular bars. This cylindrical grid *b*, is enclosed in a close cylindrical-case *a*; a narrow space being left all round between the grid and the case; and there is also a small space left between the bottom *c*, of the grid and the plate *w*. The axis *f*, has several arms *g*, g^1, radiating out from it horizontally in different directions at different parts of its length; and the uppermost arm *g*, is furnished with upright pins *h*, working between the pins *e*, that project downwards from the top *u*, of the case *a*. The axis is driven by a band passing round the pulley *p*; and from it motion is communicated, by means of the worm *i*, formed upon it, to the worm-wheel *j*, fixed on the shaft *k*, and thence, through the toothed-wheels *l*, *m*, *o*, to the feeding-rollers *n*. The cotton is spread upon an endless travelling apron *q*, by which (together with the feeding-rollers *n*,) it is delivered regularly and continuously into the upper part of the cage, where it is first subjected to the action of the pins *e*, *h*, which partially open out and loosen the close matted knots of cotton. As the cotton descends in the cage, it is struck by the arms or beaters g^1, and, being rapidly whirled round, it is carried by centrifugal force against the upright bars *b*; and the dirt, which has been disengaged, passes through into the space *y*, between those bars and the case *a*. The cotton is interrupted in its progress by the pins *d*, (projecting from the bars *v*,) which cause it to be subjected to further blows from the ends of the arms g^1; and by the time the cotton has descended nearly to the bottom of the cage, it will have been much beaten and opened, and much dirt and other extraneous matter will have passed between the bars *b*, and also through the grid *c*, into the space between that grid and the plate *w*; and, finally, the cotton is thrown out by centrifugal force through the horizontal shoot *r*. The rapid revolving motion of the arms *g*, g^1, causes a current of air to pass between the bars *b*, into the space *y*, and that current assists the passing of the dirt through the grid; the air which supplies such current entering into the cage at the same opening in the top *u*, through which the cotton descends. The current of air, after entering the space *y*, descends into the case *x*, from which it escapes through the flue *t*, carrying with it the dust and lighter dirt; but the seeds and heavier particles of dirt remain at the bottom of the case *x*, and can be removed through suitable openings in the same, closed by doors when the machine is at work. The shoot *r*, may have an endless cloth applied to it, for carrying away the cotton regularly, with a roller resting on the cotton for partially closing the shoot, so as to prevent the escape of the current of air. If it is desired to increase the current, produced as above mentioned, two or more radial arms, with a vane or fan *s*, at the end of each, are affixed on the lower end of the axis *f*, and enclosed in a circular case *z*; this case has a hole in the centre of the upper side, through which the air is drawn in, and it is driven out again through a horizontal flue, not shewn in the drawings. Machinery constructed in the above manner may be used for opening short wool and hair as well as cotton wool.

The second part of the invention consists in two improvements in machinery for carding cotton and other fibrous substances. The first improvement consists in the application to ordinary carding machinery of what the patentee terms a "dirt extractor," for removing dirt, seeds, or other extraneous matters, which may be in the cotton or other fibrous substance when it is presented to the carding machinery. For this purpose, a partition, marked *a*, in fig. 4, (which is a vertical section of a carding-engine) is fixed vertically across the framing, beneath the central line or axis of the "licker-in" roller *b*, which is situated at the feeding end of the carding-engine. The current of air which is caused by the rapid motion of the large cylinder or swift *c*, passes between the upper edge of the partition and the under side of the licker-in roller; and, by blowing against the cotton, which is at the time spread lightly in the cards of the licker-in roller, the loose portions of dirt, which may be in that cotton, will be removed by the action of the said current of air.

The second improvement in carding machinery consists in the application of a pair of revolving rollers (marked *d*, *e*, in fig. 4,) for doffing or stripping the filamentous web or sheet of carded cotton, or other fibrous material, from off the surface of the doffer-cylinder *f*; such rollers being adapted to perform the functions of the ordinary stripping comb or plate, which is actuated with a rapid up and down motion by revolving cranks. The said comb, with the revolving cranks, swords, guides, and other parts usually employed for giving motion to the comb or plate, are all to be removed from the carding-engine (or omitted in the making of the same), and the rollers *d*, *e*, are to be substituted for them; the surfaces of the rollers being almost in contact with the teeth of the cards in the doffer-cylinder. The upper roller is preferred to be of iron, covered with leather, and varnished or japanned; whilst the lower one is a plain smooth iron roller. *f*, *f*, are two rails, covered with felt or cloth, and applied one above the upper roller *d*, and the other beneath the lower roller *e*, for the purpose of rubbing the surfaces of the two rollers, and clearing them of any cotton, or fibrous material, which may adhere to them. The filamentous web of cotton, after having passed between the rollers *d*, *e*, is treated in the same manner as if it had been stripped off by a comb in the usual way.

The third part of this invention relates to machinery for grinding the cards of carding-engines; and consists, firstly, in improvements in machinery for grinding the flats or top cards of carding-engines, to enable several flats or top cards (or as many as constitute the set belonging to one engine) to be introduced together into the grinding machinery, and ground in rapid succession. The grinding cylinder is a revolving drum, with its axis mounted horizontally in a suitable frame; and its surface covered with emery, in the usual manner; but, instead of the several flats or top cards being placed in the machinery one at a time, and each one removed after it has been ground, before another can be introduced, the whole number of flats or top cards are placed horizontally, side by side, in a row, with the teeth downwards, in a carriage, which travels on the horizontal rails of the frame, in a direction transversely to the length of the flats, and of the grinding cylinder, so as to carry each card in its turn with a slow motion over the grinding cylinder. Fig. 5, is a side elevation, and fig. 6, an end elevation of a grinding machine, constructed according to this improvement. *a*, is the framing; *b*, is a driving-pulley, on the end of the axis *c*, of the grinding cylinder *d*; which cylinder is covered with emery or other suitable grinding material, and is turned rapidly by a band passing round the pulley *b*. *e*, is a carriage for receiving the several flats or top cards *f*, in a row, side by side, with the teeth downwards; and the carriage is supported by grooved wheels *i*, which run upon the rails *k*. The several flats are held in their places in the carriage by the two ends of each flat being fastened into a clamp by a screw *g*, (see fig. 6,); each of which clamps can be raised or lowered by means of a vertical adjusting screw *h*, so as to set each of the cards with the points of its teeth in exact conformity with the same level plane as the upper part of the circumference of the grinding cylinder *d*. The carriage is moved slowly along the rails *k*, by means of a strap *s*, at each side; the straps pass round the pulleys *r*, *r*, at each end of the framing *a*, and their ends are fastened to the carriage *e*; so that on the pulleys being made to revolve, the straps will draw the carriage along the rails *k*. Motion is given to the pulleys *r*, by means of a worm-wheel *p*, fixed on one end of the axis *q*, and actuated by a worm *o*, on the upper end of an inclined axis *n*, which has a worm-wheel *m*, fixed on its lower end, and gearing into the worm *l*, on the axis *c*. When all the cards have been carried in succession over the grinding cylinder *d*, by the motion of the carriage *e*, the carriage will come into contact with a lever-catch *v*, and move the same, so as to lower the bearing of the upper end of the axis *n*, until the worm *o*, quits the teeth of the worm-wheel *p*, when the carriage will stop; the set of flats is then removed, and the empty carriage is moved back by hand to the position shewn at fig. 5, ready for receiving another set of flats. The cylinder *d*, is caused to traverse slowly backwards and forwards, in the direction of its length, at the same time that it is revolving rapidly, by means of an oblique rim formed around a revolving wheel *t*, and entering into a groove around the wheel *u*, which is fixed on the axis *c*, of the cylinder *d*; so that the wheel *t*, being turned slowly round by its contact with the wheel *u*, the oblique rim of the wheel *t*, gives the traversing motion to the cylinder *d*.

The third part of this invention refers also, as before stated, to an improvement in machinery for grinding the cards of the small rollers of carding-engines, termed strippers and clearers. According to this improvement, several such rollers (or as many as constitute a set belonging to the same carding-engine) are to be mounted on a frame in a row, with their axes horizontal and parallel to one another, in pairs, consisting of one stripper and one clearer, and with the surfaces of the adjacent rollers of each pair in contact; all the rollers are then to be turned rapidly round, but so that the several surfaces which are in contact will move in opposite directions, and with the teeth of the cards on each roller moving with their points backwards. The teeth will thus act one against the other, and effect the requisite grinding or sharpening; and they may be supplied with oil and emery to increase their grinding action. Every alternate roller should have a small extent of slow traversing motion, in the direction of its length, during the operation of grinding. Fig. 7, is a side elevation of machinery, constructed according to this improvement. *a*, is the framing, furnished with suitable bearings for receiving the axes of the strippers *d*, and clearers *e*. The bearings for the axes of the strippers *d*, are fastened by screws to the frame *a*; but the bearings for the axes of the clearers *e*, are formed in separate pieces *f*. The pieces *f*, which are at opposite sides of the frame *a*, are united in pairs by two horizontal rods *k*, which pass through holes in the frame *a*, and are capable of sliding endways in the holes, in order that the clearers may receive the small extent of traversing motion before mentioned during the grinding. This traversing motion is given by similar means to those already described, with reference to figs. 5, and 6, viz., by means of oblique rims formed on three wheels *l*, *l*, *l*; which rims act in grooves around the centre bosses of the pulleys *i*, *i*, and around the main axis *b*. The wheels *l*, are mounted on studs fixed to the three pieces *f*, and are turned by their oblique rims acting in the before-mentioned grooves; and, in so turning, the obliquity of the rims gives the requisite traversing motion to the pieces *f*, and the clearers mounted thereon. The several rollers are caused to revolve by similar means to those by which they are turned when in the carding-engine; the strippers *d*, have grooved pulleys at their ends, and are driven by an endless band *g*, passing over them and around the pulleys *i*, *i*, and a pulley *h*, on the main shaft *b*; the clearers *e*, also have grooved pulleys at their ends (on the opposite side of the machine to that where the pulleys of the strippers are situated) and are driven by an endless cord, acting in the same manner as the endless band *g*.—[*Inrolled in the Rolls Chapel Office, September*, 1847.]

To James Carter, *of Oldham, in the county of Lancaster, painter, for his invention of an improved lubricator.*—[Sealed 14th December, 1846.]

This improved lubricator is applicable to lubricating shafts, bearings, axles, or the working surfaces of machinery in general, and is intended to furnish a certain quantity of oil or other liquid lubricating matter to the working surfaces at certain determinable intervals; which intervals, as well as the quantity of oil or other lubricating matter supplied, may be easily varied and regulated at pleasure.

The construction and application of the invention will be readily understood by reference to Plate XI., wherein the lubricator is shewn, as applied to a bearing or journal, carrying a shaft, and is calculated to furnish the oil or other liquid lubricating matter once in every five thousand two hundred revolutions of the said shaft. Fig. 1, is a side elevation of the apparatus; and fig. 2, is a transverse section of the same. *a, a,* is the shaft or axle to be lubricated; *b, b,* is part of the journal or bearing carrying the same; and *c, c,* is the cap or top-plate of the said bearing. To the top of the cap *c, c,* a box *d,* is attached; to which is fixed a bracket *e, e,* for carrying the shafts *f,* and *g.* Upon the shaft *a, a,* is keyed a worm *h,* which is cast in two pieces (for the convenience of fixing on the shaft), and fastened together with small screws. This worm actuates a worm-wheel *i,* of twenty teeth, keyed to one end of the shaft *f,* which, at its other end, carries a worm *j,* in gear with a worm-wheel *k,* also of twenty teeth, keyed to the shaft *g,* which also carries a worm *l,* for driving a worm-wheel *m,* having twenty-seven teeth. This wheel *m,* is fixed at the upper end of a hollow plug *n,* which is ground true, and revolves in the box *d.* To the top of this hollow plug *n,* is fixed the cup or vessel *o,* which contains the oil or other liquid lubricating matter. The plug *n,* is open at top and bottom, and has two openings *p,* and *q,* one at each side; it is also provided with a midfeather, extending above the opening *p,* and below the opening *q.* As the plug *n,* revolves, the opening *q,* coming opposite to the screw *r,* allows the oil to fill the space between the plug and the end of the screw *r.* The revolution of the plug then brings the opening *p,* opposite the screw *r,* and allows the oil left in the space between the screw and plug to pass through the lower part of the plug *n,* on to the shaft *a;* at the same time the opening *q,* comes opposite to the screw *s,* and fills the space between the end of the same and the plug *n,*—and so on alternately. Thus it will be seen, that the quantity of oil left in the spaces at the ends of the screws *r,* and *s,* is furnished to the shaft *a,* twice in each revolution of the plug *n;* and as the wheel *m,* has twenty-seven teeth, and the wheels *i,* and *k,* have each twenty teeth, then 20 × 20 × 27 = 10400;

therefore, the oil is furnished twice in ten thousand four hundred revolutions of the shaft *a*, or, as above stated, once in five thousand two hundred revolutions: it will of course be evident that the quantity of oil may be regulated by means of the screws *r*, and *s*; and the intervals between each supply may also be regulated by altering the relative proportions of the gearing. It will also be evident, that the same arrangements of mechanism may be applied, with a slight variation, to lubricating flat surfaces, such as substituting a ratchet wheel and click, or other suitable contrivance, for the worm *h*.

The patentee claims the construction and arrangement of mechanism consisting of the box *d*, and plug *n*, as shown in the drawing, and above described, when applied to the purpose of lubricating; without confining himself to the particular mode of actuating the same, or to the exact proportions or dimensions of different parts of the same.—[*Inrolled in the Petty Bag Office, June*, 1847.]

Specification drawn by Messrs. Newton and Son.

To George Robert Skene, *of Bedford, Esq., Fellow of the Royal Medical and Chirurgical Society, for improvements in making and refining infusions and decoctions.*—[Sealed 31st March, 1847.]

This invention consists in a mode of constructing kettles or apparatus for boiling water expeditiously, before it is mixed with the substance from which the infusion is to be made; and also in a method of constructing apparatus for making and refining infusions, whereby the infusion is agitated by the action of heat causing the air to ascend through it, and on the source of heat being removed, a partial vacuum, in a compartment beneath the infusion, is formed, which vacuum causes the infusion to percolate quickly through a filtering medium into this lower compartment, in a perfectly refined state.

In Plate XI., fig. 1, is a longitudinal section, and fig. 2, a back view of a kettle, constructed according to this invention, so as to present a larger extent of heating surface to the action of the fire. This kettle differs from those of the ordinary construction, in the bottom being formed with a longitudinal cleft or angular bend, which extends from the back of the kettle nearly to the front. Fig. 3, is a vertical section of a vessel for making and refining infusions, placed on a stand *a*, over a spirit-lamp *b*. The vessel is divided into an upper or extracting-chamber *c*, and a lower or air-chamber *d*, by a funnel-shaped partition *e*, having an opening in the centre to receive a filtering apparatus or "basket-sieve," which consists of an arched perforated plate *f*, and a piece of cloth or other suitable material; *g*, is a handle, by which the filtering apparatus is introduced and withdrawn.

The mode of using the apparatus for making an infusion or "air decoction" is as follows:—The water being heated to the required temperature in the kettle, shewn at figs. 1, and 2, or in any other suitable vessel, the cloth strainer is to be secured on the basket-sieve by an India-rubber band, cord, or other fastening, and the basket-sieve placed in the opening of the partition *e*; the cap *h*, is to be secured air-tight on the spout of the chamber *d*; then the materials from which the infusion is to be made are to be introduced into the chamber *c*, the hot-water or other fluid poured upon them, and the lid *i*, placed on the top of the chamber *c*. Heat is now to be applied under the air-chamber *d*, by means of a spirit-lamp, hot hob-iron, or other heating medium, in proportion to the quality of the infusion to be refined, or to the required duration of the maceration, which can be prolonged by letting air into the chamber *d*, as often as the air is driven out by the heat; thus causing it to ascend through the ingredients in the chamber *c*, and agitate them; but for ordinary purposes, such as making tea, coffee, or other infusions of small vegetable particles, one charge of air in the chamber *d*, is sufficient. When the air nearly ceases to bubble up through the ingredients, the heating medium is to be removed, and the vessel may be placed on a cold plate or other cooling surface; the infusion will then quickly percolate through the sieve or filtering medium into the chamber *d*.

In cases where it is thought desirable to prevent the agitation of the ingredients, the cap *h*, of the spout may be loosened, and the air will thus be allowed to escape from the chamber as it is expanded by the heat; but the cap must be fixed on again before the heating medium is removed, so that a partial vacuum shall be created, to cause the filtration of the infusion into the chamber *d*.

The patentee claims, as his invention, the apparatus for heating water expeditiously; and the mode of agitating infusions and air decoctions by warm air, and causing a current among them to promote evaporation, if there be need of it; as well as the mode of combining and retaining sieves within a frame or basket; and the mode of dividing a vessel, by filtering apparatus, into two chambers, thereby preventing fluids in the upper chamber from descending into the lower chamber without improved filtration and increased evaporation, if required, till expulsion of air in the lower chamber has made room for the fluid.—[*Inrolled in the Inrolment Office, September,* 1847.]

To George Henry Fourdrinier, *of Hanley, in the county of Stafford, paper maker, for improvements in preparing the materials used in manufacturing earthenware and china, and in printing the designs for ornamenting the same.*—[Sealed 23rd July, 1846.]

This invention relates, firstly, to an improved mode, or improved modes, of sifting or separating the fine portions or particles of the earthy matters, of which earthenware and china are to be composed, from the coarser portions, as well as hard lumps, stones, and other extraneous matters; and, secondly, to improvements in the process of printing, or in the apparatus to be employed therein, whereby the operation is rendered less prejudicial to health, and may be performed with greater facility than when conducted in the manner now generally adopted.

The first part of the invention consists in the employment of a sieve or strainer of a peculiar construction, and formed principally of metal, so as to be much more durable and less liable to derangement than the straining apparatus usually employed in this manufacture. The improved apparatus for straining or separating the finer portions of the earthy particles from the coarser is somewhat similar in construction and operation to some kinds of pulp-strainers employed in the manufacture of paper, and is shewn in Plate XI. Fig. 1, represents a side elevation of the apparatus; and fig. 2, a longitudinal vertical section. *a, a, b,* is the stationary framing of the machine or apparatus, and may be made of cast-iron or any other suitable material; *b,* is the main shaft, for actuating the moving parts of the apparatus, by means of a strap *c,* which passes from a pulley *d,* on the said shaft, *b,* to a smaller pulley *e,* on the shaft *f,* at the opposite end of the machine. The shaft *b,* is mounted in suitable bearings attached to the framework, and may be actuated by manual labor, through the agency of a crank or winch-handle, as shewn. The shaft *f,* is also mounted in bearings, affixed to the framing, and carries at each end a tappet-wheel or ratchet-wheel *g, g,* which, by being keyed on to the said shaft, are made to revolve therewith. The strainer is shewn at *h, h*;—it consists of a rectangular metal or wooden frame or box, mounted on pivots at one end in the bearings *i, i*; its opposite end being furnished with a long horizontal bar *j,* from the extremities of which vertical rods or arms *k, k,* descend, and rest by their lower ends on the peripheries of the tappet-wheels *g, g*; and, therefore, as these latter are made to revolve by means of the band or strap *c,* and pulleys *d,* and *e,* this end of the strainer will have a short but rapid up-and-down or vibrating movement communicated to it. The bottom of the strainer is formed of a series of straight bars *l, l,* of brass, copper, or other metal, either round, square, or of other suitable form, and from an eighth to half an inch and upwards in width or thickness; or a series of strips of metal or other suitable material may be used.

Figs. 8, represent, in detached sectional and longitudinal views, the form of bars which the patentee prefers for the construction of his improved strainer. It will be seen, that the upper surface, upon which the materials to be strained are placed, is made flat or even, in order to prevent the interstices from becoming clogged up. These pieces of metal, whether in the shape of bars or strips of metal, must be placed side by side; leaving long but very narrow spaces between them; the width of the interstices depending, of course, upon the degree of fineness to which the material is required to be strained. When the bars of the form shewn at figs. 3, are used for the strainer, they are cast roughly in the required form, and then ground, filed, or faced, to make their upper surface and edges even. Projecting pieces *p, p,* are cast at each end of the bar; and projecting pins *q, q,* are also cast at or near the middle of the bars, and a hole is made through their length and through the thickness of the bar. These bars are supported in their places by inserting their ends in grooves made in, or attached to, the rectangular box *k, k*; and they are further supported in the middle or other parts, according to their length, by passing rods through the holes of the pins *q, q,* and securing them to the sides of the box. The width of the interstices between the rods or bars is regulated by thin pieces of metal placed between the projecting pieces *p, p,* and also by a series of washers, which are placed between the bars and on the supporting rods, which pass through the holes *q, q.*

Another convenient method of separating the strips or bars of metal, so as to leave interstices of the proper width, is to bind round, or place between, the bars, thin pieces of sheet metal, string, silk, leather, parchment, or other flexible material, so as to keep them slightly apart; but any other plan, which will effect the desired object, may be employed. The strainer, thus constructed, or according to the other plans hereafter described, is placed in, and surrounded by, a vat or open vessel *m, m,* having a spout for emptying it at *n.* When the apparatus is to be put in operation, this vat is to be partially filled with water, so as to reach about half-way up the height of the bars of the strainer. The earthy matters to be strained, having been first well mixed with water, are placed in the box of the strainer; and the machine is then set in action by turning the winch-handle, which communicates a rapid vibrating motion, in a vertical direction, to the strainer, as already mentioned; and every time the strainer is raised by the teeth or tappets of the wheels *g, g,* a vacuum will be formed under the strainer, and the fine portions of the earthy matters will be forced through the interstices of the strainer, by the pressure of the atmosphere into the vat or vessel *m*, the bottom of which is inclined towards the exit aperture or spout *n*. In order to prevent the accumulation of the heavier particles of the earthy matters, a small pipe *r*, is adapted to the lower end of the vat or vessel *m*, and terminates in the spout *n*, as shewn in the drawing. By means of the spout *n*, and pipe *r*, the earthy matters, as they pass through the strainer, are conveyed away to any suitable receptacle, where they may be allowed to settle for use. As the water and finer portions of the earthy matters pass through the strainer, the box *h*, must be kept supplied. After working some time, it will be found necessary to remove from the strainer the coarser portions of the earthy matters, and other extraneous substances, which are kept back by the strainer; this is effected by simply raising or turning back the box *h*, on its pivots *i*, *i*, so as to bring it into the position shewn by dots in fig. 1; when all the extraneous matters can be removed with facility into the trough *o*, from whence they may be made to pass through an aperture or hole in the bottom to any convenient receptacle. In place of constructing the strainer of a number or series of bars, or strips of metal, plates, perforated with holes, or cut in long narrow slits, may be employed; or, instead thereof, lawn, silk, or other suitable textile fabric may be used to form the straining surfaces; but when these materials are employed, they must be supported beneath by a metal, wooden, or other framing; otherwise the fabric will be liable to be damaged by the pressure of the atmosphere, when a vacuum is produced beneath. The vibrating motion (which is communicated to the strainer for the purpose of forming the vacuum beneath the strainer, and thereby causing the earthy particles to pass through) may also be produced by other mechanical means, which will readily suggest themselves to any intelligent mechanic, and may be varied according to the discretion and judgment of the manufacturer; or the vacuum may be produced by means of an air-pump or fan-wheel, or by any of the known means of producing exhaustion.

The second part of the invention relates to an improved arrangement of press for printing designs for ornamenting earthenware and china. It consists, firstly, in heating such parts of the press or its appendages as require artificial warmth, by means of steam, hot air, or hot water, conveyed thereto through pipes, in place of employing charcoal or other fires, as usual; and, secondly, in an improved arrangement or construction of the working parts of the press, whereby the operation of printing is facilitated, and performed with a less amount of labor than heretofore. Fig. 4, represents a side elevation of the improved press. *a*, *a*, *a*, is the fixed framework of the press, which is represented as consisting of cast-iron, but may be constructed of wood or other material, if preferred. *b*, *b*, is a stationary bed or box on which the plate for giving off impressions is placed, and may be firmly secured by the clamps and screw *c*, *c*, *c*, as shewn by dots in the figure. This bed *b*, *b*, is made hollow, for the purpose of being heated by steam, hot air, or hot water, through the pipe *d*: the condensed steam, or water, or air, is drawn or passed off through the pipe *s*, *s*. A travelling frame *e*, *e*, *e*, carries the pressing-roller *f*, on the axle of which is a handle or lever *g*, for the purpose of actuating the roller and frame; and when, by depressing the lever *g*, the frame and roller are made to advance (as shewn by dots in the figure), the pressing-roller is made to pass over the copper-plate *h*, and give the requisite pressure for producing an impression; the plate having been previously inked, as usual, and provided with a sheet of paper to receive the impression. The copper-plate *h*, from which the impressions are taken, being a fixture while under operation, the travelling frame must of course be moved back when an impression has been taken; and, after the printed sheet of paper has been removed, the plate must be recharged with color as it lies in its place.

The backstone or color-box on which the color is placed is seen at *j*; it consists of a plate of iron or metal fixed on a metal box, which is supplied with steam, hot air, or hot water, by a branch of the pipe *d*; by which means the backstone or color-box is kept warm, and the color is thereby made to work more easily. Between the stationary bed or box *b*, on which the copper-plate is fixed, and the backstone or color-box *j*, is placed the "boss-board" *k*, on which the boss or cloth, used for removing the superfluous color from the plate *h*, is placed, when not in actual use. This boss-board consists of a plate of copper or other metal, placed on a bed of horse-hair, or other bad conductor of heat, whereby it is always kept cool. During the operation of printing, the workman stands opposite the copper-plate *h*, (the pile of paper to be printed being rather behind him, and on his left); he charges the plate with color from the backstone or color-box *j*, in the usual manner, and removes the superfluous color from the plate with a pallet-knife and boss or cloth, which boss or cloth, when not in use, is placed on the cool boss-board *k*, as before mentioned. When the plate is properly cleaned off, a sheet of paper is placed thereon; the travelling-frame *e*, is then brought forward, and the pressing-roller *f*, is made to pass over the plate and paper (as shewn in the figure), by depressing the hand-lever *g*; and the requisite pressure having been given, the frame *e*, and its roller *f*, are moved back again, that the printed impression may be removed from the plate. It should be observed, that the travelling-frame *e*, *e*, carries on each side two pairs of antifriction rollers *i*, *i*, which run on or in grooves attached to the framing, for the purpose of steadying the frame in its motion, and assisting in giving the requisite pressure; the pressing-roller *f*, is also furnished with blankets or padding as usual, for the purpose of imparting the required degree of elasticity to the pressing surface. These blankets, or the padding, may be applied, adjusted, or removed, by moving back the frame *e*, until the pressing-roller passes the end of the stationary bed *b*, where there is a vacant space left at *a*, for this purpose.

The patentee claims, Firstly,—the employment of apparatus, as above described, for straining the earthy matters of which china or earthenware is composed, and particularly constructing the straining surface of bars or strips of metal, or other suitable material, of any convenient and appropriate form; or of metal or other suitable material, perforated with holes or long slits or perforations. He also claims forming the straining surface of the apparatus of lawn, silk, or other suitable textile fabric, supported beneath by a frame or perforated plate; and likewise the right to form a vacuum under straining surfaces, employed for the purposes above mentioned, either by causing the said surfaces, when the machine is in operation, to vibrate or move up and down in a vertical direction, or by any other means whereby a partial vacuum or exhaustion can be produced. Secondly,—he claims the arrangement above shewn and described, or any modification thereof, for printing the ornamental patterns or designs for earthenware, whereby the operation is much facilitated.—[*Inrolled in the Petty Bag Office, January*, 1847.]

Specification drawn by Messrs. Newton and Son.

To William Eaton, *of Camberwell, in the county of Surrey, engineer, for improvements in machinery for twisting cotton or other fibrous substances.*—[Sealed 9th February, 1847.]

This invention of improvements in machinery for twisting cotton or other fibrous substances relates to the preparation of "rovings" of cotton or other fibrous substances, and is intended to give a slight degree of twist to the rovings, just previous to their being wound on to the bobbins, preparatory to spinning.

In Plate XI., various plans for effecting this object are shewn. By the apparatus shewn at figs. 1, and 2, the roving of cotton or other fibrous material is conducted down a tube or hollow shaft, and passed once or twice round a vertical fixed pin or spindle, from which it is conducted through an eye or trumpet between a pair of delivering-rollers, or on to a bobbin, which is driven round at a proper speed. The twist is given to the roving by lapping it round the fixed vertical spindle; but other means may be employed, in which the roving is not passed round a fixed vertical spindle.

Fig. 3, represents an apparatus in which the twist is given to the roving by carrying the bobbin, on which it is wound, round a centre spindle, which is also made to revolve in the same direction, but at a different speed to that at which the bobbin moves round the said centre spindle.

Fig. 4, is a representation of another method of putting twist into rovings. In the plan shewn in this figure, the bobbin moves round horizontally on a centre at the same time that it revolves on its axis, and thereby a slight twist is given to the roving while it is being wound on to the bobbin.

The methods by which the patentee proposes to effect the object of his invention being thus briefly pointed out, he next proceeds to describe, more in detail, the peculiar construction and arrangement of the apparatus or machines which constitute his improvements.

Fig. 1, is a front elevation, and fig. 2, a side view of the first-mentioned plan, in which the cotton or other fibrous substance is conducted from a pair of drawing-rollers down the inside of the tubular spindle *a*, which is mounted vertically in a hollow bearing *a**, and is actuated by means of a band, coming from any prime mover, and passed round the pulley *b*. A toothed-wheel *c*, is fixed to the under side of the hollow bearings *a**, and therefore always remains stationary; and a similar toothed-wheel *d*, on the upper end of the short shaft *e*, gears into the stationary toothed-wheel *c*. The shaft *e*, is mounted in bearings at the end of an arm, extending from the tubular spindle *a*, and is, consequently, carried round with the said spindle, when the latter is put in motion by the band and pulley *b*. Another toothed-wheel *f*, at the lower end of the shaft *e*, gears into a similar wheel *g*, which is stationary, and is mounted on a spindle that passes through the lower bearing *e**, of the shaft *e*. A short conical wooden pin *h*, is attached to the lower side of the wheel *g*, and a part of the lower end of this pin is cut away at *i*, for the purpose hereafter explained. The lower end of the conical pin *h*, is inserted in the metal cup *i*, at the upper end of a short tube *j*, which is supported by an elastic arm *l*, (fig. 2,) and is furnished, at its lower end, with a trumpet-mouth. It will now be understood, that as the toothed-wheel *c*, is fixed to the hollow bearing *a**, and therefore always remains stationary, the wheels *d*, and *f*, will, with their shaft *e*, be carried round this stationary wheel *c*, and, consequently, the lower toothed-wheel *g*, and its conical pin *h*, will be always kept in the same position, that is, prevented from rotating. To the lower extremity of the tubular spindle *a*, a curved conductor or flyer *m*, is attached, for the purpose of conducting the roving from the interior of the spindle *a*, to the conical pin *h*, below. The operation of the machine is as follows:—The roving is conducted from the drawing-rollers down the interior of the tubular spindle *a*, along the curved conductor *m*, as shewn by the dotted line, on to the stationary conical pin *h*, round which it is lapped once or twice. This is effected by keeping the conical pin *h*, and wheel *g*, stationary, as above explained, and causing the hollow spindle *a*, and its curved conductor or flyer *m*, to rotate round it; and as fast as the roving is lapped round the conical pin *h*, by the rotation of the flyer, it is drawn off through the hole *i*, at the lower end of the pin *h*, down the short tube *j*, and out of the trumpet-mouth, between the metal or other pressing-roller *n*, and the large delivering-roller *o*, which must of course have a suitable motion communicated to it for this purpose. The roller *n*, is mounted in slotted guides, made in or attached to the side-frames of the apparatus, and is kept in contact with the large under-roller, by means of helical or spiral springs, which press upon and force down the axle of the roller *n*, as clearly shewn in the drawing. The twisted roving having been delivered by the rollers *n*, and *o*, must of course be wound on to a bobbin by any of the known means.

The patentee observes, that in putting the above apparatus into operation, a large number of them might be ranged, side by side, in a frame, and the several parts would perhaps be actuated in a somewhat different manner to that shewn in figs. 1, and 2; for instance, the hollow spindles might be driven by a series of bevil-wheels, mounted on a shaft, extending the whole length of the frame. The roving also might be delivered direct from the trumpet of the tube *j*, on to a bobbin driven by surface speed, precisely in the manner now usually adopted.

Fig. 3, represents a sectional elevation of another plan for putting twist into rovings. The bobbin on which the roving is to be wound is shewn at *p*, and is mounted on a horizontal arm, attached to a collar *q*, through which the centre spindle *a*, of the apparatus passes freely, so that the collar *q*, may, as required, be moved up and down the spindle, which is furnished with a feather *r*, in order that it may carry round with it the collar *q*, and its bobbin. A helical spring surrounds the upper part of the spindle, and is made to press upon the collar *q*, for the purpose of keeping the bobbin *p*, in contact with the circular surface-plate *s*, through which the spindle *a*, also passes freely, and is driven by a toothed-wheel *t*, at its lower end. The hollow spindle *a*, is supported from below by a cup-bearing *u*, and also, at or near the centre, by the fast collar or bearing *u**, which also supports the boss of a toothed-wheel *v*, that is secured to the under side of the surface-plate *s*, as shewn in the drawing. It will be seen that the wheels *t*, and *v*, are of different diameters, the former (by means of which the spindle *a*, is driven) being larger than the other, which belongs and is connected to the surface-plate *s*. These wheels *t*, and *v*, are actuated by spur-wheels *w*, and *w**, which are mounted on the same vertical spindle, but are of differing diameters; so that the wheel *t*, and spindle *a*, will be driven at the rate of eight revolutions to nine of the wheel *v*, and surface-plate *s*. The roving to be operated upon is supplied to the apparatus from the feeding-rollers above, and passes from thence through a small trumpet *x*, at the end of the horizontal arm *y*, which extends from and is fixed to the upper part of the hollow spindle *a*. The trumpet *x*, is placed in a groove, made in the arm *y*, so that it may be moved along the arm nearer to or further from the centre hollow spindle, for the purpose of laying the roving on the bobbin *p*, in a regular and uniform manner. The trumpet *x*, is made to traverse to and fro along the arm *y*, by means of a cord, fastened at one end to the trumpet, and at the other end to a roller *z*, below. This cord passes along the arm *y*, and down the inside of the hollow spindle, and through a hole in the step or cup-bearing *u*, to the roller *z*, to which it is affixed. As the upper end of the cord, by being fastened to the trumpet *x*, will be carried round the centre spindle, while the opposite end is held firmly, the cord will become twisted; but, in order to prevent its destruction, which would otherwise soon occur, it is divided into two parts, which are connected together by means of a small swivel, placed inside the hollow spindle, as will be readily understood. The circumference of the roller *z*, to which the lower end of the cord is attached, is just equal to the length of the bobbin *p*; therefore, by causing the roller *z*, to make exactly one revolution, it will coil on its periphery a length of cord equal to the length of traverse of the trumpet *x*. This roller may be actuated in any convenient manner, either by means of the gearing shewn in the drawing, or by means of a ratchet, actuated by a pall or click, as will be easily understood by mechanics. It will be obvious that a very slow rotation of the roller *z*, will be sufficient to cause the trumpet *x*, to traverse in proper proportion to the speed of the bobbin *p*; and this rotary motion may be produced by connecting the roller, or its appendages, to any convenient part of the driving apparatus belonging to the frame to which the above mechanism may be applied. When, by means of the toothed-wheels or palls, the roller *z*, has been made to perform one rotation, the pall of the ratchet-wheel (shewn in the drawing) must be disengaged, by shogging the wheel laterally, by means of a rod or lever; and the roller *z*, will be caused gradually to rotate in the opposite direction, by the force of the coiled spring in the groove of the horizontal arm *y*, acting against the trumpet, and driving it back; care being taken that this retrograde motion is as uniform and gradual as the opposite motion. The patentee remarks, that the ends of the cops may be made conical, by any of the ordinary means now in use for gradually decreasing the length of the traverse as the diameter of the bobbin increases.

It will now be understood that by the continual rotation of the hollow spindle, with its arm *y*, and the surface-plate *s*, the roving will be slightly twisted and gradually wound on to the bobbin, which will of course increase in diameter, but will always be kept in contact with the surface-plate, by the force of the spring on the loose collar *q*; when the bobbin is full, it is drawn off its spindle and replaced by an empty one.

Fig. 4, represents a third mode of effecting the object of the invention. In this case the bobbin *p*, on which the roving is to be wound, is mounted in guides within a flyer.

The roving to be operated upon passes from the delivering-rollers above, through the hollow spindle *a*, over a wire semicircle to the trumpet-guide *x*, which is mounted in a groove made in the horizontal bar *y*, and is caused to traverse to and fro along this bar, in a similar manner to that explained with reference to fig. 3. A cord is attached at one end to the trumpet *x*, and after passing along the guide-bar *y*, down one side of the flyer, and through the centre of the hollow spindle and step or support *u*, it is finally attached to and wound round a drum or roller, similar to and actuated in the same manner as the one shewn at *z*, fig. 3. The cord, as in the former instance, consists of two parts, joined together by a swivel, which is placed in the hollow support, as shewn in the drawing. Rotary motion is communicated to the hollow spindle and flyer, in which the bobbin *p*, is mounted, by means of the toothed-wheel *t*, which may be actuated by any convenient arrangement of gearing, or such as is usually adopted in tube-frames. Any required amount of twist may be given to the roving by this means, and it now only remains to explain the manner in which the roving is wound on to the bobbin. This is effected in the following manner:—On the lower part of the stationary support *u*, a bevil-wheel *w*, is fixed; and on the lower end of a diagonal shaft *q*, which passes through holes in the flyer, is mounted a bevil-pinion, in gear with the stationary wheel *w*. On the upper end of the shaft *q*, is mounted an endless screw, which gears into and drives a wheel *v*, on the end of the spindle of the fluted surface-roller *s*, which actuates the bobbin *p*. When, therefore, the shaft *q*, with its bevil-pinion in gear with the wheel *w*, is carried round by the flyer, the shaft *q*, will be made to rotate in its bearings, and will, consequently, actuate the bobbin *p*, through the medium of the endless screw and wheel *v*, on the spindle of the surface-roller *s*. The surface-speed of the roller *s*, must be the same as that of the delivering-roller above, in order that the roving may be lapped on to the bobbin in a proper and regular manner, as will be well understood by any cotton spinner.

In conclusion, the patentee remarks, that several sets of the apparatus or mechanism, above described, may be mounted in a frame, somewhat similar to, or in the manner of, the tube-frames now used for twisting rovings; it will therefore be evident that the arrangement of the several parts must, when applied in this manner, be somewhat modified, to suit the views and opinions of different manufacturers; the improvements, therefore, are shewn distinct from any of the well-known machines, it being left to the manufacturer or machine-maker to apply the improvements in any manner he may think most desirable and convenient.

The patentee claims, Firstly,—the means of putting a twist into rovings or soft yarns of cotton or other fibrous substances by causing the said yarn or roving to lap round a stationary pin or spindle, from which it is drawn off with the twist in it, and, as a twisted roving, may be then wound on to a bobbin. Secondly,—the means of putting a twist into rovings or soft yarns, by the arrangement or construction of apparatus shewn in figs. 3, and 4, or any modification thereof.—[*Inrolled in the Petty Bag Office, August,* 1847.]

Specification drawn by Messrs. Newton and Son.

To ROBERT SNOWDEN, *of 7, City-road, Middlesex, tea-dealer, for improvements in treating or dressing coffee, to render it more wholesome for use.*—[Sealed 25th February, 1847.]

This invention relates, firstly, to a method of removing dirt, dust, and extraneous matter from the coffee-berry, previous to roasting the same; secondly, to improvements in roasting coffee, by means of which the offensive smell given off in the ordinary process is got rid of, and the coffee is brought to a fit state to be deprived of the fibrous or chaffy particles which are found in the berry, and known to the trade as the "wing" of the coffee-berry; and thirdly, to improvements in cleansing the coffee (after being roasted and crushed) from such fibrous or chaffy particles.

In Plate XII., fig. 1, is a longitudinal section, and fig. 2, a transverse section of the apparatus for dressing the coffee-berry, previous to roasting it. *a*, is a cylinder of wire-gauze, or of thin sheet-iron, or other metal, perforated with numerous holes, and fixed upon the frame *b*; to the upper part of it, at one end, a hopper *c*, for introducing the coffee, is applied; and in the lower part of it, at the other end, a discharging aperture *d*, is formed. Through the cylinder a shaft *e*, extends, carrying a series of brushes *f*, made of hair, cane, whalebone, or other suitable material; this shaft is furnished at one end with a pulley *g*, around which an endless band, from a steam-engine or other first mover, passes, for the purpose of communicating rotary motion to the shaft; and at the other end there is a pulley *h*, connected by an endless band with a pulley *i*, on the axle of the rotary fan *j*. Coffee being introduced into the cylinder through the hopper *c*, the shaft *e*, is caused to rotate with its brushes; by which means the dirt, dust, or other matter adhering to the coffee-berry is detached, and partly expelled through the wire-gauze or perforated metal composing the cylinder; the action of the brushes also causes the coffee to proceed gradually to the other end of the cylinder, where it falls through the aperture *d*, on to the inclined shoot *k*, and thence into a vessel below; and, in falling, the coffee-berry is subjected to a current of air from the fan *j*, by which the remainder of the dirt, &c., is removed.

The coffee-berry is now subjected to the action of the "semi-roasting" apparatus, represented in longitudinal section at fig. 3, and in transverse section at fig. 4. It consists of a cylinder of wire gauze or perforated metal *a*, provided with a door a^1, through which the coffee is introduced; and mounted on a shaft *e*, which is caused to rotate by a band from a steam-engine or other first mover passing around the pulley *o*. The cylinder *a*, is placed in a close cylinder *l*, the upper half of which turns on hinges l^1, to admit the cylinder *a*; the cylinder *l*, (and consequently the cylinder *a*,) is heated by a furnace *m*, beneath; and in the top of the cylinder *l*, is formed a longitudinal opening *n*, for the vapours from the inner cylinder to escape through during the process of semi-roasting. After the semi-roasting, the coffee is again subjected to the action of the dressing apparatus before described. This operation detaches and removes the external fibres or skin, and by the action of the current of air from the fan the coffee is also cooled, preparatory to the next operation, viz., completing the roasting.

The roasting apparatus, which is represented in transverse section at fig. 5, consists of a cylinder *a*, of unperforated sheet iron, or any other metal or suitable material, mounted on a hollow shaft *e*, open at the ends, and having a number of perforations in that portion of it which is within the cylinder, for the purpose of carrying off all vapours generated during the roasting. The cylinder is lined with glass, porcelain, china, enamel, or other similar or suitable material; or it is made wholly of glass, porcelain, earthenware, or other suitable material. The cylinder is heated by means of the furnace *m*, beneath, and is caused to rotate by means of a band passing around a pulley on the end of the shaft *e*, until the coffee is sufficiently roasted. After the roasting, the coffee is again passed through the dressing apparatus, which detaches all the external fibres that were not removed by the previous operation.

The coffee is now crushed, by passing it through the apparatus shewn at fig. 6, which consists of a pair of rollers *a*, *a*; above which, a hopper *b*, is placed, for supplying the berry to be crushed; *c*, is a feed-roller, for ensuring a continuous fall of the berry on to the rollers. The crushed coffee is passed through the dressing apparatus, to remove the fibres or chaffy particles from the interior of the coffee berry (which chaffy particles have been hitherto ground with the coffee berry); and the coffee is now ready to be ground for use.

Instead of using the dressing apparatus for cooling the coffee after the roasting process, another apparatus may be employed for that purpose, consisting of a wire gauze or perforated metal cylinder, mounted on a hollow revolving shaft, which is open at the ends, and has numerous perforations formed in it, to admit air into the interior of the cylinder.

The patentee claims, Firstly,—the use of a wire gauze or perforated cylinder, having a brush therein, for the purpose of cleaning the coffee berry from extraneous matters. Secondly,—the use of a perforated or wire gauze cylinder, revolving in another cylinder, placed over a furnace, for the purpose of roasting or semi-roasting coffee, preparatory to its being finally roasted, as above described. Thirdly,—the use of the perforated or wire gauze cylinder, having a brush or brushes therein, in conjunction with a fan or blower, as above described, for the purpose of cooling the coffee after semi-roasting or roasting. Fourthly,—the use of a cylinder for roasting coffee, made of glass, porcelain, or earthenware, or lined with glass, porcelain, earthenware, or enamel. Fifthly,—the removing of the internal fibrous pellicle or wing from the coffee berry, either in a raw or roasted state, by the means above described, or by similar means.—[*Inrolled in the Inrolment Office, August,* 1847.]

To SAMUEL KEELING, *of Hanley, in the county of Stafford, manufacturer of earthenware, for an improved method of making candlesticks.*—[Sealed 19th June, 1847.]

THIS invention consists in constructing candlesticks in such a manner, that the false bottom of the socket, or the "moveable platform" which supports the candle, may be raised or lowered without removing the candlestick from the table or other surface on which it is placed. To effect this, the patentee makes a joint in the upper part of the stem of the candlestick, in order that the top of the candlestick may be turned round, for the purpose of giving motion to a screw within the stem; by means of which screw the moveable platform is raised or lowered. The patentee has shewn two modes of constructing candlesticks according to his invention: in the first mode, the moveable platform turns round as it ascends or descends; and in the second mode, the platform does not turn round as it is moved up or down by the screw.

In Plate XI., fig. 1, is a vertical section of a candlestick, exhibiting the first mode of construction. *a, b,* is the stem of the candlestick, consisting of two parts, jointed together at *c*; the bore of the upper part or nozzle *b*, is slightly oval or excentric, so that the disc *d*, (which is made to fit it) may not turn within it; and the socket is formed with a shoulder at *e*, for the disc to rest upon. The disc *d*, has a boss formed upon its under side, with a groove in the periphery of the same, to receive the ends of two pins carried by a tubular frame *f*; which arrangement, while it permits the nut to revolve with the socket on the top of the stem *a*, prevents the nut from rising; the frame *f*, being retained in its position by means of the screwed rod *g*, the end of which is inserted through a disc of cork or other suitable material *h*, at the bottom of the stem, and is screwed into a suitably-formed opening at the lower end of the frame *f*. The false bottom or platform *i*, is fixed on the top of the rod *j*; the upper portion of this rod is squared, and passes through a square opening in the centre of the disc *d*; so that, on motion being given to the nut, it will carry the rod *j*, round with it;—the lower part of the rod has a screw formed upon it, and works in a nut *k*, fixed to the frame *f*. Above the disc *d*, is a washer *l*, of cork, India-rubber, gutta-percha, or other material possessed of sufficient elasticity or pliability to permit it to be turned round freely within the socket,—while, at the same time, it is made to fit the socket sufficiently well to prevent any melted tallow from descending below it; and in the centre of the washer a square opening is formed, of exactly the proper size for permitting the rod *j*, to pass through it freely, but preventing the passing of the melted tallow. The action of the before-mentioned parts, when the candle is required to be raised, is as follows:—On the nozzle *b*, being turned by the thumb and finger, it will carry round the disc *d*, and rod *j*; and the screw-thread of the latter, acting in the nut *k*, will cause the rod to rise, and, consequently, the platform or false bottom *i*, on which the candle rests. By turning the nozzle in the reverse direction, the platform or false bottom is caused to descend.

The second mode of constructing candlesticks is shewn at fig. 2. In this case, the disc *d*, has a circular opening at its centre (instead of a square one), and a screw-thread is formed therein. The screwed portion of the rod commences immediately beneath the false bottom *i*, and extends downwards for about two-thirds of the length of the rod; the remaining portion of the rod has a vertical slot made in it, to receive the ends of two pins *m*, fixed to the frame. The nut *k*, is dispensed with; but the remaining parts are the same as those shewn at fig. 1. It will be evident, that on the disc or nut *d*, being moved round, by applying the thumb and finger to the nozzle *b*, the screw-thread in its central opening acting on the screwed portion of the rod *j*, will cause that rod to rise, as it is prevented from turning by the pins *m*. The external parts of the candlesticks may be made of metal, earthenware, china, glass, or any other fit material; but the internal parts (with the exception of the elastic washer) are preferred to be made of iron, brass, or some other suitable metal; and the candlesticks may be made of any shape or pattern that will admit of the above parts being introduced into the stem thereof.

The patentee claims the construction of the stalk or stem of a candlestick with a joint and interior screw, so arranged, that by turning the upper part of the stalk or stem in the proper direction, the moveable platform and candle may be raised or lowered within the socket, as required, and in manner hereinbefore described.—[*Inrolled in the Inrolment Office, August,* 1847.]

To Edward Vickers, *of Sheffield, in the county of York, merchant, for an invention of improvements in machinery for cutting files,—being a communication.*—[Sealed, 19th January, 1847.]

In devising machinery for cutting files, a difficulty, hitherto insurmountable, has been experienced, from the variation in the hardness or density of the metal at different points of the "blank" to be wrought upon; or, to state the difficulty more specifically, when the piece of metal or blank is softer in some parts than others, the chisel of the file-cutting machinery will cut deeper in such parts; and, as the feeding motion is regular, the chisel, in its next descent, will strike in the groove previously made, and merely widen the said groove, without forming another tooth. Great difficulty has also arisen in accommodating the chisel edge to what is termed the "wind" of the blank, or the imperfection of the surface. By means of this invention, it is stated, these difficulties are avoided; the improved machine being so arranged as to imitate the manual process which is now in vogue for cutting files. This process, as is well known, consists in placing the chisel-edge in advance of a tooth which has been formed, and on the smooth part of the blank, and drawing it back until the operative feels the said tooth, when the blow is immediately given with a heavy hammer, whereby the succeeding tooth and its adjacent groove are formed. In the improved machine, this function is effected by so arranging the chisel that, for each groove and tooth, its cutting edge is made to reach out and slide back, in a manner analogous to the manual process above specified,—the movements of the chisel being produced by mechanism which will be explained in the sequel.

The figures in Plate XII., represent various views of the file-cutting machine; fig. 1, is a plan view; fig. 2, is a longitudinal vertical section, taken in the line A, B, figs. 1, and 3; and fig. 3, is a transverse vertical section, taken in the plane of the line C, D, fig. 2. Figs. 4, 5, and 6, are detail views, shewing modified ways of applying the principle of one essential part of the improvements. E, E, E, (figs. 1, 2, and 3,) is the main framing of the machine, for supporting the several operative parts: it may be made of iron or any other suitable material. F, F, (figs. 1, and 2,) is the main driving shaft, having a fast pulley G, and loose pulley H, on one end (for the application of the motive power in the usual way); and a fly-wheel I, on the other end, to regulate its motions. The plain piece of steel, or the blank *a*, *a*, as it is termed, the several faces of which are to be wrought upon, is placed on a bed-piece *b*, (figs. 1, and 2,) made of some of the softer metals (for a reason which will be obvious), and having on its upper side a groove or recess to receive the blank. The metallic bed-piece *b*, is secured in a wide cavity or trough in the top of the feeding-block *c*, *c*, by means of adjusting and confining screws *d*, *d*, *d*, placed and operated as will be seen and understood by inspection of fig. 1. The blank *a*, *a*, is held always to a firm bearing in the said groove in the bed-piece *b*, by means of the weighted bands *e*, *e*, *e*, secured each at one end to a confining screw *d*, *d*, as shewn in fig. 1, and passing over the blank, as shewn in the said figure. The feeding-block *c*, *c*, is arranged in any proper manner, so as to slide on the top of the framework E, E, as shewn in figs. 1, and 2, and is drawn or moved along by the revolving endless screw-shaft *f*, *f*, which works in a nut *g*, *g*. This nut, which is of a peculiar construction, is shewn detached at fig. 7. It is composed of two pieces, or half rounds, attached respectively to one of a pair of levers 1, 1, turning on pivots projecting from a bed-plate 2. Across these levers 1, is a bracing-piece 3, to which the levers are connected by screws, one of which is free to slide in a slot cut in the bracing-piece, and allow the levers 1, to come closer together, or recede, as the case may be. These levers have, however, a tendency to keep apart, by reason of a spring 4, being placed between them. 5, is a lever, turning on a pivot affixed to the bracing-piece 3, and provided at its fulcrum end with a hub, or excentric piece, which acts upon the side of one of the levers 1, when the outer end of the lever 5, is depressed; by which means, the parts of the nut *g*, are made to advance towards each other, and embrace the screw-shaft *f*. The screw-shaft is driven by a twisted band *i*, *i*, which passes from a drum or pulley *k*, mounted on one end of the shaft (see fig. 2,) and is carried round a transverse revolving shaft *l*, (figs. 2, and 3,) having bearings in the lower part of the framework. The shaft *l*, is itself caused to rotate by a band passing from a pulley *m*, near one of its journals to and around a pulley *n*, on the driving shaft F, F.

In the file-cutting machines, hitherto employed, the chisel has been held firmly, either in the hammer or striker, or in a vibrating arm under the same, and the blank has been drawn along under the edge of the chisel by a regular feed-motion, so as to receive the cut of the chisel, as it answers to the successive blows of the hammer. But these modes of arrangement, for the reason hereinbefore stated, of the varying hardness of the blank, have been found inadequate and unsuccessful in forming good or perfect files.

The chisel, which is represented at *o*, (see figs. 1, and 2, and the enlarged detached view, fig. 2*,) is arranged so as to move up and down, and shift its position on the rectangular slot of the chisel-frame *p.* It is guided and actuated in its movements by the long bent spring *q,* in front; the vertical bent spring *r,* in its rear; the horizontal bent spring c^3, provided with a button d^3, fixed at its end, and bearing against the rear face of the chisel near its top; and the wedge-shaped stud or projection *s,* standing on the front face of the chisel near its top; and also the front piece or lip *w,* of the chisel-frame *p.* The bent spring *q,* performs one of the most essential functions in operating the chisel, in a manner similar to the manual process above mentioned; which function is, putting the chisel out after each blow of the hammer, in front of a tooth previously formed, preparatory to its being drawn or pressed back against the same, for the formation of a succeeding groove or tooth. The upper end of this spring is attached to the projection *t,* from the top of the chisel-frame *p,* while the lower end passes through a slot in the lip or front-piece *w,* of the said frame, and through a hole in the chisel *o,* (when it assumes the shape and has the office of a pivot, or pin for the support of the said chisel) to the rear side of the same, where it is bent down in such a manner as to tend to hold the chisel against the inner face of the lip *w,* and also to press the said chisel down, as shewn in the drawing. By this arrangement of the parts above described, it will be seen that when the chisel-frame *p,* is in the process of rising (which process will be explained in the sequel), the chisel *o,* will not begin to rise until the upper end of the lip-piece *w,* has come in contact with the stud *s.* As, therefore, the lip *w,* moves first, and the feed-motion is continuous, the front face of the chisel will have a tendency to be separated a little from the lip *w;* but when the chisel does begin to rise, and is raised out of the groove which it has just cut in the blank, the spring *q,* will pull the edge of the chisel forward against the lip *w,* and in front of the tooth just formed. This will give the chisel a position in which its front face will form an angle more obtuse with the remaining plain face of the blank than before;—the wedge-shaped stud *s,* assisting in this operation of throwing or removing the chisel-edge forward. But when the frame *p,* descends again, the chisel-edge (as will be apparent from inspection of fig. 2,), being pressed down by its springs, will first come in contact with the face of the blank; and as the frame p, continues its descent, the lower edge of the lip-piece w, will press the chisel-edge back until it comes against the tooth last formed; whilst at the same time, the spring c^3, fig. 1, by pressing its button d^3, against the rear or back part of the chisel v, will bring the front face of the said chisel to a fair bearing against the inner face of the lip w: the chisel will then be in a proper position to receive the blow of the hammer, and effect the cutting of another tooth. The back spring r, is intended to assist in guiding and steadying the chisel in its movements; but it might perhaps be dispensed with, without materially affecting the operation of the machine. The chisel-frame p, is supported in the forked ends x, x, of the swivel-frame y, by the bolts which pass through the sides of the said chisel and swivel-frames, as represented in the plan view, fig. 1; the hammer-head being broken away, to shew these parts more clearly. This swivel-frame y, is attached, by a pin or stud z, to the end of the vibrating lever or arm c^1, c^1, figs. 2, and 3, so as to be capable of turning thereon. By this means, the swivel-frame may be adjusted to and secured in such a position as will allow of the edge of the chisel or cutting-tool being brought either across the blank, at right angles to its length, or in any oblique direction desired. The vibrating lever or chisel-arm c^1, c^1, which carries the swivel-frame and its appurtenances, rocks on a fulcrum-pin d^1, in the upright bracket-piece e^1, which piece e^1, is fitted in an elongated slot f^1, cut through a horizontal shaft g^1, g^1, having its bearings in the framing E, E, (figs. 1, 2, and 3.) This bracket-piece e^1, is confined in any position in the said slot by a binding-screw h^1, The rear end of the chisel-arm c^1, c^1, is connected by means of an arm z^3, (which turns freely on a pin, fitted in the said end, as shewn in fig. 2,) to an arm or lever i^2, arranged in the elongated slot n^1, (shewn distinctly in fig. 3,) in the shaft k^1, k^1, which may be denominated the chisel-actuating shaft. This shaft k^1, k^1, is mounted in bearings in the framing E, and receives a rocking motion from an excentric i^1, on the driving-shaft F, F, coming in contact (as it revolves) with the end of an arm m^1, fixed on the shaft k^1, k^1, as shewn by dots in fig. 2. y^3, y^3, is a counteracting spring, attached to the lower part of the framing E, and connected to the shaft k^1, k^1, through the medium of a lever and pendant-rod n^3. It will now be readily understood, on inspecting the drawing, that as the shaft k^1, k^1, is caused to rock in its bearings, by reason of the eccentric i^1, and arm m^1, it will, through its connection with the chisel-arm c^1, c^1, cause that lever to vibrate, and thereby raise the chisel from the blank. When the larger radius of the cam i^1, has passed the end of the arm m^1, the spring y^3, will come into operation, and assist in bringing down the chisel on to the face of the blank to be cut. The elongated slots f^1, and n^1, above mentioned, as being formed respectively in the shafts g^1, g^1, and k^1, k^1, are intended to allow of the chisel-arm c^1, c^1, being moved laterally, so that oblique teeth can be cut on the blank in the reverse direction to those formed while the arm is in the position denoted in fig. 1. The shaft g^1, g^1, is capable of rocking in its bearings, and it is held in any required position by the following contrivance:—o^1, o^1, is a cord, connected at one end to an arm p^1, which stands up from the periphery of the shaft g^1; and the other end of the cord is connected to a spring q^1, attached to the end-framing of the machine. By this arrangement, a tendency is given to the cord o^1, to pull or turn the rocker-shaft g^1, g^1, round on its axis; but this tendency is counteracted, where there is no other strain, by a ratchet-sector s^1, on the top of the arm r^1, attached to the shaft g^1, g^1. The teeth of this ratchet engage with a spring-pall t^1, secured to one end of a cross-bar or rod u^1, which connects the upper parts of the side-framing B, together. The arms p^1, r^1, are arranged at opposite ends of the rocker-shaft g^1, g^1, and the teeth on the ratchet-sector s^1, are so formed and connected with the pall t^1, as to permit the shaft g^1, g^1, to turn towards the front of the machine, when sufficient strain is exerted on the upright bracket-piece e^1, through the medium of the chisel-arm c^1, c^1, to overcome the resistance of the spring q^1, which, through the cord o^1, and arm p^1, gives the shaft an opposite tendency, as above stated. Now when, as was before suggested, the chisel comes to a soft place in the blank, it will form a wider groove, and a larger tooth, than where the blank is harder; and when the chisel is again raised, and reaches out in front of the said tooth, as above explained, it will, in drawing or sliding back, meet the tooth previously formed sooner than ordinary; and being kept down in contact with the blank, by the long spring *q*, the resistance which it meets with against the tooth draws the chisel-arm c^1, e^1, and upright bracket-piece e^1, forward (overcoming the resistance of the spring q_1), and turns the rocker-shaft g^1, proportionally, and consequently moves the sector-ratchet s^1, attached to that shaft; so that the pall t^1, engages with another tooth of the said ratchet, and thereby keeps the ratchet s^1, and rocker-shaft g^1, g^1, in the position thus assumed, and preserves the gain on the feed-motion, thus made, in a manner which will be readily understood.

Instead of the mode above described with reference to figs. 1, 2, and 3, for preserving the gain on the feed-motion, the following may be adopted:—The metallic bed-piece *b*, (see fig. 4,) is fitted into the cavity or trough of the feeding-block *c*, *c*, so that it may slide along in the same. At one end, the bed-piece is provided with a retarding spring *u*; and to its other, or front end, a frame *v*, is attached. In a slot in this frame, a helix-shaped ratchet *w*, is mounted, so as to be capable of turning when required. To the axle of this ratchet one end of a coiled spring *z*, is attached; its other end being secured to the frame *v*. *y*, is a pawle, attached to the front of the feeding-block *c*, *c*, and intended to take into the teeth of the ratchet *w*. This helix-shaped ratchet is set with its smallest radius tooth, in connection with the pawle *y*, and when the chisel-edge catches against a tooth formed on the blank, it will prevent the bed-piece *b*, and its frame-piece *v*, from moving forward, and thereby disengage the ratchet *w*, from its pawle *y*; while, at the same time, the coiled spring *z*, will pull the ratchet *w*, round or down, until a tooth more remote from its axis engages with the pawle *y*; and thus the gain on the feed-motion is preserved by a mechanical arrangement, analogous to that before described.

Another mode of effecting the same result is represented at figs. 5, and 6; the principle of operation being substantially the same as in those above described. In this arrangement, the chisel-arm c^1, c^1, is caused to slide in a vibrating frame a^2, a^2, which should be secured to the rocker-shaft g^1, g^1, (fig. 2,) by its ends b^2, b^2. A retarding spring c^2, operating, like that above referred to at x, in fig. 4, is attached, one end to the rear end of the chisel-arm c^1, c^1, and the other to the frame a^2, a^2. The swivel-frame y, (figs. 1, and 2,) with its appendages, is connected to, and turns on the circular head-piece d^2, of the chisel-arm c^1, c^1. A helix-shaped ratchet e^2, similar to that above described, is arranged on the small shaft f^2, f^2, (fig. 5,) which has suitable bearings in the frame a^2, a^2. The ratchet e^2, turns in a slot formed in the chisel-arm; and the front end of the slot is chamfered off, so as to operate as a pawle, and engage with the teeth of the ratchet e^2, as shewn at fig. 6. A coiled spring i^1, is placed at the side of the ratchet e^2, and connected at its ends respectively with the shaft f^2, and the chisel-arm c^1, so as to draw or turn down the ratchet when it is free to move. The chisel-edge, when in contact with a tooth on the blank, pulls the chisel-arm c^1, c^1, forward; the gain thus made on the feed-motion, is preserved by the helix-shaped ratchet e^2, in the same manner as has been above described and referred to in fig. 4.

It will be obvious that other methods may be adopted, in which the parts above described, or others mechanically equivalent to them, may be arranged to effect the desired result of making and preserving any gain made on the feed-motion, as hereinbefore specified; but the principle, or *modus operandi*, will be substantially the same, so long as either the bed-piece on which the blank is held, or the chisel-arm, which operates the chisel, is capable of yielding, when the chisel-edge strains against a tooth, and the advance or gain made by such yielding is retained by a ratchet and pawle, or other analogous device. Immediately above the chisel is a hammer or striker k^2, arranged on the outer end of the vibrating lever, l^2, l^2, and intended, by its fall, to force the edge of the cutter into the blank, to form the teeth thereon. The inner end of this lever is secured to the shaft m^2, (figs. 2, and 3,) which is mounted in suitable bearings in the framework E, E, to allow of its turning sufficiently to vibrate the lever l^2, l^2. The movement of this shaft m^2, is effected by means of an arm or projecting pin n^2, (figs. 2, and 3,) which bears against the face of an escapement cam o^2, on the driving-shaft F, F. The force of the blow of the hammer is regulated by the horizontal spring p^2, p^2, one end of which bears upon the top of the hammer k^2, when at its highest position; and the other end is fixed on the cross bar or rod u^1, and is projected out in rear of the same, as shewn in fig. 2. The rigidity or elastic power of this spring p^2, p^2, may be increased or diminished by the screws q^2, q^2, which operate through the ends of a regulating bar v^3, fastened to the top of the cross bar u^1. The excentric i^1, and escapement cam o^2, are arranged loosely on the driving-shaft F, F, and may be thrown in or out of connection with a stud r^2, on the said shaft, so as to revolve with the shaft, or remain stationary, while the said shaft continues to turn. This result is effected as follows:—A grooved collet s^2, is attached to the side of the escapement cam o^2, as shewn in fig. 1; and a projection x^2, from the side of this collet comes in contact with the stud r^2, standing up from the shaft F, when the said cams revolve with the shaft. A fork t^2, affixed to the shaft u^2, fits into the groove of the collet s^2; and the said shaft u^2, is so arranged in bearings in the framework E, E, as to allow of its sliding in the direction of its length. When the projection x^2, from the side of the collet s^2, is in connection with the stud r^2, it is kept so by the lever v^2, v^2, which has a fulcrum at w^2, at the rear end of the framing E, and presses against the pin y^2, on the under side of the shaft u^2, (see fig. 3,); the front end of the said lever, in this case, being confined in a notch in the framework at z^2. By disengaging this end of the lever from the notch, a spring a^3, bearing on the outside of one of the journals of the shaft u^2, (as shewn in fig. 1,) will press it longitudinally; and by the connection of parts, above explained, will disengage the projection x^2, from the stud r^2, and allow the driving-shaft to revolve, while the cams on it remain stationary. The arrangement of the above-described parts, for gearing and ungearing, is such, that when the teeth are raised on the blank, throughout the length of one of its faces, the whole operative machinery will be made to cease working, by means of the stud b^3, on one side of the feeding-block c, c; which stud, at the stage of the process just mentioned, comes in contact with the forward end of the lever v^2, v^2, and throws the said lever out of its notch z^2. This movement of the lever v^2, allows the spring a^3, to disengage the excentric i^1, and cam e^2, from the driving-shaft; while, at the same time, the lever w^2, w^2, being properly formed for that purpose, presses on the lever 5, and causes it to turn on its centre; whereby the larger radius of its excentric part will be removed from contact with the side of the lever 1, and allow the spring 4, to throw the nut g, g, out of connection with the screw f, f. The feeding-block c_1, c_1 may then be drawn back, another face of the blank turned up, and the machinery set by hand for renewed operation. The mode of mounting the chisel o, as hereinbefore explained, allows of its edge, when in contact with the face of the blank, being adjusted with reference to the imperfection of the said face, or being accommodated to the wind of the blank.

The patentee claims, First,—the general arrangement and construction of machinery for cutting files, as above described and shewn in the drawing; and particularly the mode of mounting the chisel or cutting-tool in the swivel-frame, and connecting it with the chisel-arm, for the purpose above set forth. He also claims the mode of adjusting the position of the chisel, to give a cut at a proper distance from the tooth last formed on the blank, when the groove of such tooth (owing to the varying texture of the metal) has been made broader than was required. And, Lastly,—he claims the several modes, hereinbefore described, for retaining the gain which the chisel or cutting-tool may have made on the feed-motion.—[*Inrolled in the Petty Bag Office, July,* 1847.]

Specification drawn by Messrs. Newton and Son.

To Patrick Moir Crane, *of Ynisced wyn Iron Works, near Swansea, iron-master, for improvements in the manufacture of iron.*—[Sealed 8th April, 1847.]

This invention relates to an improvement in that part of the manufacture of malleable iron where what is called refinery iron is produced, by melting pig-iron in a refinery furnace; and it consists in a mode of employing anthracite or stone-coal in the process of making refinery iron. The patentee says, he is aware that this has been before attempted, but without success, on account of the peculiar character of the anthracite or stone-coal, which is liable to decrepitate and fly off into dust on sudden exposure to heat; now, the present invention consists in subjecting the anthracite or stone-coal to heat, before introducing it into the refinery furnace. The preparatory heating may be effected in any convenient way; and the coal may be used either in an ignited or highly-heated state, or in a cold state (having been first ignited or highly heated). After such preparation, the coal will bear either the hot or cold blast; and whichever blast be used, the patentee prefers that it should be introduced through two or more small tuyeres, instead of one large one. The refining process is conducted in the same manner as when coke or charcoal is used. In the manufacture of pig-iron by the aid of anthracite coal in the blast furnace, a considerable quantity of highly-heated anthracite coal comes from the furnace in lumps, in that process commonly termed by the workmen "throwing-off;" and the patentee either introduces these lumps in a heated state into the refinery furnace, or he preserves them for future use. Or, instead of employing these lumps, the patentee causes the raw anthracite coal to be ignited in masses in pits, kilns, or ovens, and, when thoroughly ignited and heated, he carries it direct to the refinery furnace, or preserves it for future use. Although the patentee has used the anthracite coal alone, other fuel may be employed therewith.

The advantages said to result from the use of anthracite coal, according to this invention, are,—that a considerable saving is effected in comparison with the coke of bituminous coal—the cinder contains less iron than that from a refinery furnace worked with the coke of bituminous coal—and in those districts where anthracite or stone-coal can alone be obtained, manufacturers of iron will now be able to refine their iron, which has not hitherto been the case.

The patentee claims, as his invention, "applying, in the manufacture of refinery iron, anthracite or stone coal, which has been ignited or raised to a high temperature, before introducing it into the refinery furnace."—[*Inrolled in the Inrolment Office, October, 1847.*]

To JAMES ROBSON, *of Dover, in the county of Kent, engineer, for a new and improved instrument to be used in crushing or expressing oil from vegetable and other substances, and in making oil-cake; and which instrument is applicable to the moulding, pressing, and manufacturing the same and other articles from plastic materials.**—[Sealed 15th April, 1847.]

WHEN expressing oil in the manufacture of oil-cake, it has been usual to employ instruments made of horse-hair, technically called "hairs," for enclosing the flannel bags containing the substance which is to be subjected to pressure; but, as the horse-hair fabric soon becomes clogged, the patentee proposes to substitute a metal instrument, constructed in the manner represented in Plate XII.

Fig. 1, is an internal view, and fig. 2, an external view of the instrument, in an open or extended state; fig. 3, is a longitudinal section of the instrument, in a closed state, containing the substance to be pressed; and fig. 4, is a transverse section of the instrument. *a*, *b*, are two metal plates or flaps, which correspond in shape to those hitherto made of horse-hair cloth; but the shape may be varied: *c*, is a piece of leather, serving as a hinge to connect the two plates or flaps together; and *d*, is a handle. Along the sides of the two plates, and likewise at the end of the plate *b*, a rim *e*, is formed, to prevent the material from being pressed beyond the edges of the plates. Across the inner side of each plate, a series of ridges *f*, and depressions

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* By a disclaimer, entered with the Clerk of the Patents, October 15, 1847, the patentee has erased from the title of his patent the words "crushing or," also "and other articles from plastic materials;" so that the title now reads thus;—"A new and improved instrument, to be used in expressing oil from vegetable and other substances, and in making oil-cake; and which instrument is applicable to the moulding, pressing, and manufacturing the same."

g, are made, in such a manner that when the instrument is closed, the ridges on the plate *a*, will come opposite the depressions in the plate *b*; and through the sunken portions of each plate a series of holes *h*, are formed, opening into grooves *i*, across the back of the plates: these holes may be one-sixteenth of an inch in diameter, and half an inch apart; but the patentee does not confine himself to these dimensions. The linseed or other matter to be pressed is prepared and placed between the plates, and pressed in the same way as when using a like instrument made of hair.

The patentee claims, as his invention, the constructing of an instrument (to be used in crushing or expressing oil from vegetable and other substances, and in making oil-cake) of metal surfaces *a*, *b*, having ridges and hollows, as above described.—[*Inrolled in the Inrolment Office*, *October*, 1847.]

To Samuel Childs, *of Earl's Court-road, in the county of Middlesex, wax-chandler, for certain improvements in the manufacture of candles, and in preparing and combining certain animal, vegetable, and mineral substances, applicable to the manufacture of candles and other uses.*—[Sealed 15th April, 1847.]

The first part of this invention has for its object the production of composite candles of very superior quality, and consists in the employment of castor-oil, which is obtained by expression from the bean or nut (instead of obtaining it by distillation), in combination with tallow, or lard, or other oils, or any of the other ingredients commonly used in making candles.

The ingredients may be combined in any of the following proportions:—Three parts of castor-oil may be combined with one part of vegetable wax, such as is commonly imported from South America and China; or one part of castor-oil with two parts of tallow; or two parts of castor-oil with two parts of margaric acid; or one part of castor-oil with two parts of lard: in each of these cases, the word "parts" is used to express the difference in weight of the materials used. The patentee states that he does not restrict himself to the above proportions, as they will require to be varied according to the average temperature of the country where the candles are intended to be used; for instance, if the candles are intended for a hot climate, vegetable wax or margaric acid should be employed, in a larger proportion than when the candles are to be used in a cold climate. The patentee also says, "a small portion of bismuth may be added in each case, as is usual in the manufacture of candles, in order to prevent the accumulation of exhausted carbon in the wick."

Compounds may likewise be formed of castor-oil, obtained by expression, and other oils, vegetable wax, tallow, margaric acid, and lard (all or any of them), for lubricating the axles of wheels, shaft-bearings, and other parts of machinery.

The patentee claims, Firstly,—the employment in the manufacture of candles of castor-oil, obtained otherwise than by distillation, as aforesaid. Secondly,—the manufacture from castor-oil, obtained otherwise than by distillation, with other oils, vegetable wax, tallow, margaric acid, and lard, all or any of them, of compounds applicable to the manufacture of candles, and to lubricating purposes, as above described.—[*Inrolled in the Inrolment Office, October*, 1847.]

Scientific Notices.

ON CERTAIN MEANS OF DETECTING THE ADULTERATION OF FLOUR.—COMMUNICATED TO THE SOCIETY FOR THE ENCOURAGEMENT OF NATIONAL INDUSTRY, PARIS, BY M. DONNY, AND REPORTED UPON BY M. BUSSY.

[*Translated for the London Journal of Arts.*]

THE detection of adulteration in flour is a question of great interest, especially at the present time, when the price of provisions is so high: it is no longer merely a chemical problem, undertaken out of mere curiosity, but has become a question of great moment to the community at large, more especially to those classes whose poverty compels them to consume bread of an inferior quality, prepared from flour which will generally admit of mixture with other substances much more easily than the best kind of flour.

From this will be readily understood the welcome reception given to a communication made to the society at its last meeting, by M. Donny, on his processes for detecting adulteration of flour, and the immediate importance of the question induced the Committee of Chemical Arts to examine into it, and report thereon immediately.

M. Donny, who is a fellow of chemistry at the University of Ghent, and author of the observations to which we are about to call attention, is already known to the society from the experiments he has made on the cause of explosions in steam-boilers, and by experiments on the liquefaction of carbonic acid.

We will examine successively, and in detail, the various means proposed by him to ascertain the presence of certain matters which are employed for the adulteration of flour.

Adulteration of Flour by means of the Fecula of Potatoes.—Amongst the means of adulteration most frequently practised, that by the addition of potato fecula is the most prominent; we will therefore consider that first.

The Society of Encouragement had, some time since, called the attention of chemists and bakers to this subject, and several prizes which were awarded thereon, shew the efforts then made in accordance with that appeal.

The process for which a prize was awarded to M. Boland, is founded on a property mentioned by M. Gay Lussac, viz., that in a mixture of wheat flour and potato fecula, the fecula, by reason of the grains being larger, is crushed before the wheat flour; and if, at that time, the mixture be washed with cold water, the liquor, on being run off, will be colored blue by the presence of iodine; whilst, under the same circumstances, pure flour produces a liquid which will not be affected by iodine.

The modification of M. Boland consists in separating, by known means, the gluten of the flour to be examined, and in triturating the mixture of starch and fecula resulting from such separation.

Although this process appears very simple, it requires, in order to perform it properly, a certain knack, which can only be acquired by practice; for instance, the form of the mortar or pestle, their degree of smoothness, and the pressure of the hand working them, and also the time of the operation, may modify the result in such a manner that, if the trituration be not continued long enough or strongly enough, the fecula may not be crushed; while, on the contrary, if too violent, or continued for too great a length of time, the wheat starch may be affected, and thus the fecula will erroneously be supposed to exist.

M. Donny proposes another plan for detecting adulteration, which is, by inspection through a microscope, or a simple convex lens.

The grains of fecula are, as is well known, of much greater diameter than those of wheat and other grain. This difference is not however sufficiently great to ensure the detection of fecula in wheat flour, if the mixture has been well made. In questions of this nature, interesting to public health, and involving nearly always the fortune and honor of some citizens, only those results must be accepted which leave no doubt as to their correctness.

For this purpose, M. Donny has taken advantage of an observation made some time ago by M. Payen, whose numerous indefatigable exertions have thrown such a light upon the chemical history of starch, and the various arts in which that natural product is employed. This observation consists in the fact that a weak solution of potash which has no visible effect upon starch, possesses, nevertheless, the property of swelling the grains of fecula, and considerably increasing their volume.

The solution employed by M. Donny is made with 1 gramme 75 centigrammes of caustic potash, dissolved in 100 grammes of distilled water, and consequently contains about 1,60^{c} of alkali. His method of proceeding is as follows;—The flour to be examined, being placed upon a sheet of glass, is diluted with the above solution, and inspected through the microscope; the grains of fecula may then be easily detected by their great size compared to the starch, which is not affected by the solution. The operation may be rendered still more certain by adding iodized water to the mixture after being well dried from the solution; as the blue tint, which will be assumed by the fecula will render the same more apparent. The difference caused by this process is so great that it is impossible to be mistaken, the grains of fecula being, by the solution, increased to a size about fifteen times as big as the starch.

This process is, without doubt, the most simple and most certain of any we are acquainted with; it allows an infinitely small quantity of fecula to be detected in the flour,—one grain even might be discovered, if sufficient time and pains were bestowed upon it.

This process is also applicable to the discovery of fecula in bread itself. For this purpose it is only necessary to take a small quantity of the crumb, and wet it through with the solution of potash; a portion of the liquid is then squeezed out, and placed under a lens: on inspecting it, grains of fecula will be discovered by their having swelled considerably; they are, however, more difficult to distinguish by their being mis-shapen by being baked; but on drying and treating them with iodine, the detection will be made with the same facility as when flour is operated upon.

Mixture of Wheat Flour with Leguminous Flour.—The leguminous substances which, when pulverized, are most commonly employed for adulterating wheat flour are, pease, haricot-beans, horse-beans, &c. It may be remarked that, the presence of these substances, when in any quantity, cause a smell which renders their detection easy; some of them, such as haricot-beans, will not combine in the making of bread, and cannot therefore be employed to any extent.

Pease-meal will not generally mix well with wheaten flour, and an eye somewhat experienced will easily detect the mixed flour, from its green appearance.

All these leguminous meals contain a peculiar substance called *legumine*, which is soluble in water, and may be precipitated by acetic acid (vinegar). The result of the presence of this matter is, that if the meal of pease or haricot-beans be treated with cold water, and a little acetic acid be added to the liquor, it becomes thick, and a white substance (which is legumine) is precipitated; on the contrary, flour from wheat and other species of corn not containing any legumine, furnish, on being treated with cold water, and when free from adulteration, a solution which will not furnish any precipitate on being treated with acetic acid.

This property has been taken advantage of, in order to distinguish fine flour from that which may have been adulterated with the above-mentioned substances. The process would be quite perfect if it were proved that in consequence of reactions, which cannot always be foreseen, the gluten or other azoted matters peculiar to cereals, or grain, could not be soluble in water, and partially precipitable by acetic acid. That which authorizes the doubt on this head is, the difference of opinion which exists amongst chemists who have tried this process.

Whatever may be the case, the following is the method proposed by M. Donny, and its efficacy has been proved. This method is founded upon the fact that the flour of leguminous substances always contains portions of cellular tissue, which may be discovered by means of a lens or microscope. In order to expose to view this tissue (which is reticulated, and consists of hexagonal meshes, and may be easily recognized when once seen), M. Donny, after having placed a small quantity of the adulterated flour on the object carrier, diluted it slightly with a solution of potash, of such a strength as to dissolve the fecula without touching the tissue. By this means, the tissue is laid bare, and its form will be very evident; and if the leguminous flour amounts only to 3 or 4 per cent., it may be discovered with certainty.

The only point which requires attention is, to take care not to agitate the mixture too much while on the object-carrier, for the cellular tissue might thereby be broken, and the operation would thus be rendered much more difficult.

Flour of Vetches or Horse-beans.—These two substances, besides possessing the peculiar characteristics possessed by leguminous substances as above-mentioned, and which would be sufficient to distinguish them, have another peculiar feature, which has not yet been discovered in any other substances.

This peculiar feature, which was discovered by M. Donny, has been applied by him, with perfect success, in detecting the presence of these two substances in flour or other mixture. For this purpose, the flour is exposed first to the action of the vapor of azotic acid, and afterwards to that of ammonia; the result of which is, that the bean-meal will be turned a purple color, whilst the others will assume a yellowish hue.

The following is the method of conducting the experiment, which was performed by us several times with perfect success:— One or two grammes of the flour to be tested, are placed in a small porcelain capsule of from two to three inches in diameter, which is slightly wetted, in order to make the flour adhere to the sides, leaving the bottom empty, and in this empty space a small quantity of azotic acid is placed, so as not to be in immediate contact with the flour. The capsule is then covered with a small glass disc, and slightly heated by means of a spirit-lamp, so as not to boil the spirit. The acid becomes vaporized, and acts upon the flour, causing it to assume a yellow tint. This tint is, however, not uniform, it being deeper at the lower part nearest the acid, and getting gradually lighter towards the top. The operation must be stopped whilst the top edge is still white, and before it has been sensibly effected by the azotic acid; the azotic acid which remains is then thrown away and ammonia substituted; the operation is then left to itself, and a ring of a bright red color will be formed around the middle of the capsule, i.e. in that part where the action of the acid has neither been too strong nor too weak. As was before observed, under the same circumstances, pure wheat flour becomes yellow.

If a mixture of the two flours be operated upon, a pink tint will be produced, in depth proportioned to the quantity of bean-meal. The color, which is doubtful to the naked eye, is very clearly seen under the lens or microscope; the tint being produced, not by a uniform coloring of the mass, as might be imagined, but by the presence of a certain number of colored particles consisting of grains of a deep red color, disseminated in a white or slightly yellow mass, which renders their detection very easy and certain. By this means, 4 per cent., and even a less quantity of bean-meal in wheaten flour may be detected; and vetch flour may be discovered by the same means.

Horse-bean meal is, of all leguminous substances, that which seems to mix best with wheaten flour; it gives greater tenacity to the dough, but imparts to the bread a disagreeable grey color; it has been employed some time by some of the Paris bakers, for the purpose of turning the bread, that is to say, causing it to separate easily from the peel when put into the oven, and also to give the upper crust the reddish-brown color so much liked, which is caused by a portion of the flour becoming candied.

The red color which the bean-meal assumes, in consequence of the reactions above described, allows it to be detected in bread; for this purpose a portion of the crumb is taken and macerated in cold water for two hours; it is then thrown into a sieve, and the liquor which runs from it is allowed to settle, and divides into two strata; the upper stratum is then removed and carefully evaporated, and the residuum is partially dissolved by alcohol; after which, the alcoholic solution is evaporated. The residuum of this evaporation, which must be carefully spread upon the sides of the capsule, is submitted to the successive action of the vapors of azotic acid and ammonia, and under the action of these re-agents the residuum will assume the characteristic red color of bean-meal. Vetch-meal may be discovered in a similar manner.

Maize and Rice Flour.—Rice flour could only be added to wheat flour in particular cases; but the flour of maize is frequently used for that purpose.

Maize and rice flour may be distinguished from wheat flour, by the fact of their presenting, under the microscope, angular surfaces, which are not seen in the latter; these fragments are produced by portions of the husk, which is hard in rice and maize, while it is always pulverulent and farinaceous in even the hardest kind of wheat. When any suspected flour is to be tested, M. Donny advises the gluten to be first separated, by ordinary mechanical means, to collect the starch, and submit it (especially the coarser portion, which is most quickly precipitated in water) to microscopic inspection, which immediately shews the angular fragments above mentioned. It is generally advisable, for this purpose, to have a lens of small magnifying power only, which will more clearly shew the difference between the fragments in question and the grains of starch.

Buck-wheat Flour.—Buck-wheat flour, like the preceding, presents angular masses, which result from the agglomeration of grains of starch set closer together; these masses may be easily detected in a mixture of buck-wheat with the best wheat flour; for this purpose, it is only necessary to separate the gluten, and take the thickest part of the starch, which is to be submitted to the microscope. The general form of these fragments is prismatic, and similar to what is called in commerce "needle starch."

These three latter kinds of flour, maize, rice, and buck-wheat, are rough to the touch, the same as potato fecula; they have not that softness and unctuosity possessed by wheat flour, which property is diminished by adulteration.

Linseed Flour.—One method of adulteration which would scarcely have been thought of, but which has been extensively practised in Belgium, consists in adding linseed flour to flour of grain, but more particularly rye. Linseed flour, on examination through the microscope, may be distinguished by the presence of small fragments (generally square), of a red color, of nearly uniform size, and very small (smaller than the grains of starch). These fragments, which are not perceptible when the grain has been previously deprived of its husk, appear, from this circumstance and their peculiar color, to belong really to the husk of the grain; their square form and uniform dimensions shew that these fragments are not the accidental result of mechanical trituration: this regularity of form depends on a circumstance which it will not perhaps be uninteresting to examine.

If a mixture of flour, containing linseed, be treated with a solution of potash, containing from 10 to 14 per cent. of alkali, the starch will be dissolved, and the fragments above mentioned will remain distinctly visible, notwithstanding their small size, in the midst of a mass of a yellowish-white color; the linseed appearing of a reddish-brown color. This substance may, by means of potash, be detected in bread, even if the flour from which it was prepared only contained from 2 to 3 per cent. For this purpose, it is only necessary to crumble a piece of the crumb into small pieces, steep it in the solution of potash, and examine the liquor resulting from it.

In conclusion, the facts made known by M. Donny (the correctness of which has been ascertained by experiments made under the inspection of your committee) appear to be worthy your attention, as they solve a very difficult problem, which has long occupied the attention of chemists and manufacturers, and the solution of which cannot fail to interest the Society very much, to whom it furnishes certain and easy means of detecting, and consequently preventing, the frauds most commonly practised with regard to flour of various kinds.

M. Donny's processes are especially valuable, from the degree of certainty of their effect, which indeed is almost infallible, and constitutes their most prominent feature, and which was precisely what was most wanted in these experiments; there is no guessing or supposition on the part of the operator, for he either sees or does not see the fecula, the cellular tissue, the red fragments, &c. In the former case, he states the result with certainty; in the latter, if he has any idea that something has escaped him, he leaves the investigation to a more clever or more patient operator. [*Bulletin de la Societé d' Encouragement.*]

ON A NEW PROCESS OF ENGRAVING, CALLED STYLOGRAPHY.

A NEW method of engraving has been invented by M. Schœler, a native of Denmark. In 1842, M. Schœler had so far perfected his invention as to produce satisfactory results, which were submitted to the King of Denmark, who rewarded the invention on the condition of his publishing a complete description of his method. In conformity with this agreement, he has just published the particulars of the process at Copenhagen, and has also made it known in Bruxelles. The Academy of Sciences of this latter city approved of it in its sitting of the 4th December last. M. Buschman d' Aurey subsequently made use of it at Antwerp, and, on the 18th of last May, his experiments were submitted to the Academy at Bruxelles.

One part of copal, three of stearine, and three of lac are melted together, and a sufficient quantity of Frankfort black is added to render the composition black. The whole is melted in a mould about six lines (or half an inch) in depth, formed of two sheets of copper, which are first rubbed over with an amalgam of tin and whiting and Tripoli, blackened over the flame of a lamp. The sheet of composition is then to be taken from the mould; it will come out easily, and will harden on contact with the air. It is afterwards to be rubbed with a solution of resin in spirits of wine, and polished; and before it is quite dry it is to be covered with silver powder, until it is like a sheet of white paper. The design is then to be counter drawn on it in red, and the whole is to be gone over with a dry-point or graver, the different shades being regulated by cutting to greater or less depths, and varying the width of the lines as well as the distances between them.

The design being engraved, it is to be cleansed with water, and covered with a solution of sugar mixed with a small quantity of nitrate of silver, and bronze powder laid on with a brush.

It then only remains to apply the known processes of galvanoplastics: first, a plate is formed in relief, and from that the plate is produced which is to be printed from, in the same manner as etched or engraved plates. The principal advantage of M. Schœler's process is, a saving of labor to the engraver, as he draws in black on a white ground, in the same manner as with pencil and paper.

The results hitherto obtained, although satisfactory, must be merely regarded as slight indications of what may be done by this process in the hands of skilful artists, when some apparent difficulties incident to all new industrial processes (such as lithography, for instance) shall have been made to disappear by practical experience.

If, however, M. Schœler's process does away with some disadvantages which are frequently encountered in the ordinary process of etching, and which are unfavorable to the production of good engravings, it necessitates an extra operation (that of electrotyping) which occasions a certain expenditure of time and money; but it is not unreasonable to suppose that by experience some improvement will be effected in this part of the process. It is not likely that *Stylography* will ever rival line-engraving in beauty; but it possesses over it the advantage of not requiring for its execution one-tenth part of the time: and moreover, by this means the artist may himself engrave his design with even greater facility than it could be lithographed; which is a great advantage, when he wishes to produce a great number of copies of his work.

M. Schœler has sent thirteen specimens of his works to the Royal Academy at Bruxelles, consisting of two landscapes, three studies of heads, portraits of Frederick VI. and Beethoven, portraits of Lord Byron at several periods of his life, and five finished studies of heads, amongst which, an oriental study, about four inches high, is a very excellent specimen, as the finest and most delicate lines, produced by the point, are well brought out. Several of these specimens have the fault of too much vigour, or rather perhaps too much hardness and dryness; a very skilful hand being required to handle the point lightly, and to produce effective shadowing; but this is easily acquired by artists, as will be seen from the perfection which has been arrived at in lithography.—[*Ibid.*]

THE ANNULAR ECLIPSE OF THE SUN AS OBSERVED AT ORLEANS ON THE 9TH OCTOBER, 1847.

BY M. MAUVAIS.

M. GOUJON and myself were sent from the Longitude Office at Orleans, to observe the annular eclipse on the 9th October last. One of the most advantageous situations to observe the eclipse was the Cathedral, that being the highest building in the neighbourhood, and the Bishop of Orleans was kind enough to put at our disposal the towers and galleries of that fine edifice. We chose the interior gallery over the southern portico.

This point has exactly the same longitude as the central belfry, which served as a landmark for the grand trigonometrical survey of France, and is about 60 yards more to the south,—so that the geographical position, from which we observed the eclipse, may be stated as follows:—

Longitude..........	0° 25′ 35″ West of Paris.
Latitude	47° 54′ 7″.

The height was about 15 yards from the ground, and consequently about 146 yards above the level of the sea.

We took with us two excellent telescopes of Lerebours'; the one used by me was of about 47 inches focal distance, 3¾ inches opening, and a magnifying power of seventy-four times. We were also provided with one of Winnerl's chronometers, and one of Breguet's counters;—a syphon barometer of Bunten's, a centigrade thermometer, one of Gambey's sextants, and an artificial horizon of mercury completed our apparatus.

The whole of Friday we employed in taking the altitude of the sun, by the sextant, at nine o'clock in the morning and three o'clock in the afternoon, to regulate our chronometer; and, at twelve o'clock, to verify our latitude.

On Saturday morning, when we took possession of our station, the sky was completely obscured; but at 6h. 49m. the sun emerged from behind the clouds, when it was already eclipsed to the extent of about a quarter of its diameter. We began to observe the occultation of the spots; but the great undulation of the atmosphere, which gave to the edges of the sun and moon a serrated appearance, did not allow the moment of immersion to be correctly ascertained; we were therefore obliged to relinquish it. At 7h. 30m., the air having become calmer, we began our observation of the formation of the ring.

The extremities of the sun's limbs were then exceedingly sharp, but without apparent distortion; only the undulations of the air gave them a serpentine appearance. When the horns had embraced three quarters of the circumference of the moon, they began to move more quickly one before the other,—their progressive movement being very visible to the naked eye. From this period, I remarked several times that this progression was not uniform, but was a jumping movement, and was not continuous, as a luminous trace was sometimes visible in front of the horn, without being united therewith. The dark interval which remained between the two was about ten seconds, and gradually became luminous, and all the detached parts were gradually united. These detached points appeared at first weak and less luminous than the rest of the sun, but gradually they became more luminous, without however changing their color.

When the extremities of the horns of the sun were within twenty-five degrees of one another, a number of luminous points suddenly appeared, to the number of ten or twelve, and detached one from the other; they appeared almost simultaneously, throughout the whole of the arc. These luminous points or lines, more or less elongated in a direction parallel to the circumference of the sun, bore great analogy to the summits of the lunar mountains, which are perceived, at the first quarter, in the dark part, and very near the light part. All these detached points, in about thirteen seconds, united and formed a continuous arc. This took place at 7h. 33m. 5.2s., mean time at Paris. The rupture of the ring was observed at 7h. 36m. 22.7s., mean time at Paris.

The difficulty of determining the instant when the ring is considered to be completely formed, renders the determination of these two phases of the eclipse very uncertain. I did not perceive the long black lines said to have been seen in other eclipses, nor the rings of round spots, nor the serrated appearance. The eclipse proceeded on the formation and rupture of the ring in the same manner as we had observed in some instances before, at the extremities of the horns, when they began to be very thin; only the phenomenon was here on a larger scale.

By M. Arago's desire, I examined with great care the dark side of the moon, with one of Savart's polariscopes, and could not find any signs of polarization: it is true that the remaining portion of the luminous ring dazzled my sight, and perhaps caused an insurmountable obstacle to the observation of so delicate a phenomenon. We endeavoured several times to discover, outside the sun, the dark part of the moon, pointed out by M.

Arago, at Perpignan, but did not succeed in discovering anything like it.

On an attentive examination of the sun's horns, we thought we observed that before the formation of the ring, or total immersion, the right-hand one was somewhat thinner than the left-hand one; while, on the rupture of the ring, or immersion, the left-hand one was the finest. In the absence of any means of measuring, we were obliged to content ourselves with an approximation: these observations are therefore given with great reserve.

The eclipse ended at 8h. 57m. 48.7s., mean time, at Paris. This last observation is believed to be very exact.—[*Comptes Rendus.*]

ON THE EBULLITION ALCOHOLMETER, FOR ASCERTAINING THE QUANTITY OF SPIRIT IN ANY COMPOUND FLUID, WHATEVER EXTRANEOUS MATTERS MAY BE IN SOLUTION THEREWITH.

BY ANDREW URE, M.D., F.R.S., &c.*

THAT the boiling temperature of water is increased by holding neutro-saline and saccharine substances in solution has been long known, and has been the subject of many experiments, made partly with the view of ascertaining from that temperature the proportion of the salt or sugar, and partly with the view of obtaining a practical liquid bath. But it seems to have been reserved for the Abbé Brossard-Vidal, of Toulon, to have discovered that the boiling temperature of alcoholic liquors is, in most cases, proportional to the quantity of alcohol, irrespectively of the quantity of neutro-saline or saccharine matter dissolved in them. When, however, such a quantity of dry carbonate of potash, or sugar, is added to a spirituous liquor as to abstract or fix in the solid state a portion of the water present, then the boiling temperature of that mixture will be lowered, in proportion to the concentration of the alcohol, instead of being raised, as would be the case with water so mixed. But, generally speaking, it may be assumed as a fact, that the boiling point of an alcoholic liquor is not altered by a moderate addition of saline, saccharine, or extractive matter. On this principle, M. Brossard-Vidal constructed an instrument for determining by that temperature the proportion of alcohol present. His chief object was to furnish the Revenue Boards of France with a means of estimating directly the proportion of alcohol in wines, so as to detect the too common practice of introducing brandy into their cities and towns under the mask of wine, and thereby committing a fraud upon the *octroi*; as the duty on spirits is much higher than on wines.

The above-mentioned instrument consists of a spirit-lamp, surmounted by a small boiler, into which a large cylindric glass bulb is plunged, having an upright stem of such calibre, that the quicksilver contained in them may, by its expansion and ascent when heated, raise before it a little glass float in the stem, which is connected by a thread with a similar glass bead, that hangs in the air. The thread passes round a pulley, mounted on a shaft which also carries an index hand, and the pulley, turning with the motion of the beads, causes the index hand to move before the face of a circular graduated scale. The numbers on this scale represent per-centages of absolute alcohol, so that the number opposite to which the index stops, when the liquor in the cylinder over the lamp boils briskly, denotes the per-centage of alcohol in it.

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* Communicated by the Author.

That instrument was placed in my hands some months ago by Mr. Field, who had obtained a patent in this country for determining thereby the strength of spirituous liquors.* I made a great many experiments on the boiling points of alcohol at various successive degrees of watery dilution, and verified the general utility of the contrivance, but I found the construction of the instrument subject to several defects. The mass of mercury to be heated in the large bulb was so great as to occasion some loss of alcohol in the course of the experiment; the length of the thread was liable to be affected by the moisture of the air; it occasionally failed to move the pulley with sufficient delicacy, on account of friction; and when the spirit in the lamp got heated in its case, it flared up and burned the thread,—thus rendering the apparatus useless till a fresh thread was experimentally adjusted to the beads.

On these accounts I renounced the construction of M. Vidal, and adopted the more simple and direct form of indication represented in Plate XII.; fig. 1, being an elevation of the instrument, and fig. 2, the scale detached, and on an enlarged size.

It consists of a flat spirit-lamp *A*, surrounded by a saucer for containing cold water to keep the lamp cool, should many experiments require to be made in succession. Above this lamp, the boiler *B*, is placed, which fits by its bottom cage *C*, upon the case of the lamp. At the point *C*, is seen the edge of the damper-plate, for modifying the flame of the lamp, or extinguishing it when the experiment is completed. *D*, is the thermometer, made with a very minute bore, in the manner of the Rev. Mr. Wollaston's instrument for measuring the height of a mountain by the boiling point of water on its summit. The bottom of the scale in the ebullition thermometer, is marked *P*, for proof on the left side, and 100 (of proof spirit) on the right side. It corresponds to 178.6 Fahr. very nearly, or the boiling point of alcohol of 0.920, specific gravity. The following table gives the boiling points corresponding to the indicated densities :—

Temp. Fahr.	Specific gravity.	Temp. Fahr.	Specific gravity.
178.6	0.9200..P.	185.6	0.9665..50 U.P.
179.75	0.9321..10 U.P.	189.0	0.9729..60 "
180.4	0.9420..20 "	191.80	0.9786..70 "
182.00	0.9516..30 "	196.4	0.9850..80 "
183.40	0.960 ..40 "	202.0	0.992 ..90 "

The above table is the mean of a great many experiments. When alcohol is stronger than 0.92, or the excise-proof, its boiling point varies too little with its progressive increase of strength, to render that test applicable in practice. In fact, even for proof spirits, or spirits approaching in strength to proof, a more exact indication may be obtained by diluting them with their own bulk of water, before ascertaining their strength, and then doubling it.

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* For the drawings and a detailed account of this instrument, see Vol. XXVIII., p. 178, Conjoined Series.

The boiling point of any alcoholic liquor is apt to rise if the heat be long continued, and thereby to lead into error in using this instrument. This source of fallacy may be in a great measure avoided by adding to the liquor in the little boiler about a teaspoonful (thirty-five grains) of common culinary salt, which has the curious effect of arresting the mercury in the thermometer at the true boiling point of the spirit, wine, or beer, to enable a correct reading to be had.

The thermometer is at first adjusted to an atmospheric pressure of 29.5 inches. When that pressure is higher or lower, both water and alcohol boil at a somewhat higher or lower temperature. In order to correct the error which would hence arise in the indications of this instrument under different states of the weather, a barometrical equation is attached, by means of the subsidiary scale *E*, to the thermometer *D*.

Having stated the principles and the construction of the ebullition alcoholmeter, I shall now describe the mode of its application.

First.—Light the spirit lamp *A*.

Second.—Charge the boiling vessel *B*, with the liquid to be tested (to within an inch of the top), introducing at the same time a paper of the powder; then place the vessel *B*, (the damper plate being withdrawn) on to the lamp *A*.

Third.—Fix the thermometer *D*, on the stem attached to *B*, with its bulb immersed in the liquid. The process will then be in operation.

The barometrical scale indicated on the thermometer, is opposite the mean boiling point of water. Prior to commencing operations for the day, charge the boiler *B*, with water only, and fix the instrument as directed; when the water boils freely, the mercury will become stationary in the stem of the thermometer, opposite to the true barometrical indication at the time. Should the mercury stand at the line 29.5, this will be the height of the barometer, and no correction will be required; but should it stand at any other line, above or below, then the various boiling points will bear reference to that boiling point.

In testing spirituous or fermented liquors of any kind, when the mercury begins to rise out of the bulb of the thermometer into the stem, push the damper-plate half way in its groove to moderate the heat of the flame. When the liquor boils freely, the mercury will become stationary in the stem; and opposite to its indication, on the left, the under-proof per-centage of spirit may be read off at once, if the barometer stand that day at 29.5 inches; while, on the right-hand scale, the per-centage of proof spirit is shewn; being the difference of the former number from 100. The damper-plate is to be immediately pushed home, to extinguish the flame.

The alcoholmeter will by itself only indicate the per-centage of alcohol contained in any wine; but by the aid of the hydrometer, the proportionate quantity of saccharum in all wines may be readily and easily determined. The hydrometer will shew the specific gravity of the liquid, upon reference to table No. 1, annexed. In testing a sample of wine, first take the specific gravity, and suppose it to be 989, then charge the boiler of the alcoholmeter with the wine, as directed, and at the boiling point it indicates the presence of alcohol at 69.6 per cent. $^{\text{up}}$, whose specific gravity will be found to be 979; deduct that gravity from the gravity of the bulk, or 989, and 10 will remain, which 10 degrees of gravity, upon reference to the wine table, will be found to represent 25 lbs. of saccharine or extractive matter in every 100 gallons, combined with 80 4-10ths gallons of proof spirit.

Sikes's hydrometer will only shew the specific gravity of liquids lighter than water (or 1000); but for wines in general use, their gravities being lighter than that article, it will answer every purpose; there are however wines whose gravities are heavier than water, such as mountain, tent, rich Malaga, lachrymæ Christi, &c., to embrace which, additional weights to the hydrometer will be required, as for cordialized spirits, &c. In testing a sample of rich mountain, its S.G. was found to be 1039, or 39 degrees heavier than water; that wine at the boiling-point indicated the alcohol at 72.5 per cent.^{up}; but 980 S.G. deducted from 1039, leaves 59 degrees of S.G.; against 59 of the wine tables will be found 147·5 or 147½ lbs. of saccharine or extractive matter combined with 27½ gallons of proof spirit to every 100 gallons.

Should the barometer for the day shew any other indication above or below the standard of 29.5, the thermometer scale will then only shew the apparent strength; and reference must be had to the small ivory indicator, *E*, it being the counterpart of the barometrical scale of the thermometer: thus—should the barometer indicate 30, place 30 of the indicator against the boiling-point of the liquid, and opposite the line of 29.5 will be found the true strength.

Example 1.—Barometer at 30.—Suppose the mercury to stop at the boiling-point 72^{up}, place 30 of the indicator against 72 on the thermometer, and the line of 29.5 will cut 69.6^{up}, the true strength.

Example 2.—Barometer at 29.—Suppose the mercury to stop at the same point, 72^{up}, place 29 of the indicator against 72 on the thermometer, and the line of 29.5 will cut 74.3^{up}, the true strength.

FOR MALTED LIQUORS.

To all brewers and dealers in fermented liquors, this principle, by its application, will supply a great desideratum, as it will not only shew the alcohol created in the wort by the attenuation, as well as the original weight of the wort prior to fermentation, but it will indicate the value of malt liquors in relation to their component parts. It will likewise be a ready means of testing the relative value of worts from sugar compared with grain, as well as being a guide to the condition of stock beers and ales.

To ascertain the strength of malt liquors and their respective values, the instrument has been supplied with a glass saccharometer, testing-glass, and slide rule. Commence by charging the testing-glass with the liquid, then insert the saccharometer, to ascertain its present gravity or density per barrel, and at whatever number it floats, that will indicate the number of pounds per barrel heavier than water.

Example 1.—Suppose the saccharometer to float at the figure 8, that would indicate 8 lbs. per barrel; then submit the liquid to the boiling test, with the salt, as before directed, and suppose it should shew (the barometrical differences being accounted for) 90^{up}, that would be equivalent to 10 per cent. of proof alcohol. Refer to the slide rule, and place *A* on the slide against 10 on the upper line of figures, and facing *B* on the lower line will be 18, thus shewing that 18 lbs. per barrel have been decomposed to constitute that per-centage of spirit; then, by adding the 18 lbs. to the present 8 lbs. per barrel, the result will be 26 lbs., the original weight of the wort, after leaving the copper.

Example 2.—The saccharometer marks 10 lbs. per barrel, and at the boiling-point it indicates 88^{op}, equivalent to 12 gallons of proof spirit per cent.; place 4 against 12, and opposite *D* will be 21½ lbs. per barrel, when, by adding that to the 10 lbs. present, 31½ lbs. will be the result.

TO ASCERTAIN THE RELATIVE VALUE:

Suppose the price of the 26 lbs. beer to be 36*s*. per barrel, and the 31½ lbs. beer to be 40*s*. per barrel,—to ascertain which beer will be the cheapest, place 26 on the opposite side of the rule against 36, and opposite 31½ lbs. will be 43*s*. 7*d*.,—shewing that the latter beer is the cheapest by 3*s*. 7*d*. per barrel.

By taking an account of the malt liquors by this instrument prior to stocking, it may be ascertained at any time whether any alteration has taken place in their condition, either by an increase of spirit by after fermentation and consequent loss of saccharum, or whether, by an apparent loss of both, acetous fermentation has not been going on towards the ultimate loss of the whole.

This instrument will likewise truly indicate the quantity of spirit per cent. created in distillers' worts, whether in process of fermentation or ready for the still; the only difference will be in the allowances on the slide-rule.

N.B.—The saccharometers applicable to the foregoing rules for beers, ales, &c., have been adjusted at the temperature 60, Fahrenheit, and will be found correct for general purposes; but where extreme minuteness is required, the variation of temperature must be taken into account; therefore, for every 10 degrees of temperature above 60, 3-10ths of a pound must be added to the gross amount found by the slide-rule; on the contrary, for every 10 degrees below 60, 3-10ths of a pound must be deducted.

FOR CORDIALIZED SPIRITS.

The operation in this instance is somewhat different from that of beers, which have the alcohol created in the original worts; whereas, in cordialized spirits, gins, &c., the alcohol is the original, and the saccharine matter, or sugar, is an addendum.

If 100 gallons of spirit are required at a given strength, say 50 per cent. under proof, 50 gallons of proof spirit, with the addition of 50 gallons of water, would effect that object; and upon testing it by the alcoholmeter, it would be found as correct as by the hydrometer. But in cordializing spirits it is different, for to the 50 gallons of proof spirit 50 gallons of sugar and water would be added; thereby rendering the hydrometer useless, except for taking the specific gravity of the bulk; and, according to the quantity of sugar present, so a relative quantity of water must have been displaced; and has the sugar has no reducing properties, the alcoholmeter will only shew the strength of the cordial in relation to the water contained in it, as the principal indicates, irrespectively of saccharine or extractive matter present.

Suppose, in making 100 gallons of cordial at 50^{up}, 3 lbs. of sugar are put to the gallon, or 300 lbs. to the 100 gallons, that 300 lbs., displacing $18\frac{41}{100}$ths gallons of water, only $31\frac{59}{100}$ths gallons of water, instead of 50, have been applied; the sugar, without reducing properties, making up the bulk of 100 gallons, which is meant to represent 50 per cent. $^{\text{up}}$.

The alcoholmeter will only shew at the full point of ebullition the alcoholic strength in relation to the water in the 100 gallons of the mixture, or 35 per cent. $^{\text{up}}$, leaving 15 per cent. to be accounted for on the bulk.

As the quantity of sugar present must be determined before that per-centage can be arrived at, a double object will be effected by so doing, namely, eliciting in all instances the quantity of sugar present, as well as the per-centage of spirit to be accounted for.

Example 1.—In taking the S.G. of a cordial, suppose it to be found 1076, then heat the liquid to the boiling point, and having ascertained the per-centage of alcohol, and it proves to be 35 $^{\text{up}}$, the S.G. of alcohol at that strength will be found to be 956; deduct 956 from the S.G. of the bulk, or 1076, and 120 will remain; refer that to its amount on the head line of table No. 2, namely, 120, under which will be found 3, representing 3 lbs. of sugar to the gallon; and by running the eye down its column to opposite the alcoholic strength indicated (35 $^{\text{up}}$) will be found 14.9, which represents the per-centage of water displaced by the sugar, and which amount of 14.9, added to the 35 per cent. ascertained, makes the total upon the bulk 49.9 per cent. $^{\text{up}}$, with 3 lbs. of sugar to the gallon.

FOR GINS, &c.

Example 3.—In taking the S.G., suppose it be found 957; then heat to the boiling point, which proves to be 14 $^{\text{up}}$, whose S.G. is 937, and this deducted from 957, leaves S.G. 20; on the head-line of table No. 2, under 20, will be found ½, or ½ lb. of sugar to the gallon, and on running the eye down to opposite 14 $^{\text{up}}$, will be found 3.0, which added to the 14, makes the total on the bulk 17 per cent. $^{\text{up}}$, with 50 lbs. of sugar to the 100 gallons.

To Chemists, for their tinctures, &c., this instrument will be found essentially useful.

N.B.—Care must be taken that the mercury is entirely in the bulb of the thermometer before it is fixed on the stem for operation, and in all cases (except for water) the salt must be used.

CONCLUSION.

Wines are peculiarly subject to be mystified by adulterations of various kinds. It will prove of great advantage to the public when the relative quantity of fruit, or *saccharum*, and alcohol requisite to constitute the normal wine of each species, is well ascertained.

Some beers possess a remarkable narcotic power, by which they cause drowsiness and stupor without corresponding previous exhilaration. Such beverages may justly be suspected of having been sophisticated with *cocculus indicus*, opium, or some analogous drug; and this suspicion may become certainty, if they be shewn by the alcoholmeter to contain only a few per cents. of fermented spirit.

No. 1.

TABLE OF SPECIFIC GRAVITIES, BY SIKES'S HYDROMETER.—

Adapted to Field's Patent Alcoholmeter for Cordialized Spirits.

TEMPERATURE 60°. SPECIFIC GRAVITY OF WATER 1000°.

60		70		80		90		100		110		120		130		140		150		160		170		180	
Wt.	S. G.	Wt.	S. G.	Wt.	S. G.	Wt.	S. G.	Wt.	S. G.	Wt.	S. G.	Wt.	S. G.	Wt.	S. G.	Wt.	S. G.	Wt.	S. G.	Wt.	S. G.	Wt.	S. G.	W.	S. G.
60	922	70	942	80	961	90	981	100	1000	110	1020	120	1041	130	1063	140	1085	150	1107	160	1129	170	1152	180	1175
1	924	1	943	1	963	1	983	1	1002	1	1022	1	1044	1	1065	1	1087	1	1109	1	1131	1	1155	1	1178
2	926	2	945	2	965	2	985	2	1004	2	1024	2	1046	2	1067	2	1089	2	1111	2	1134	2	1157	2	1180
3	928	3	947	3	967	3	987	3	1006	3	1026	3	1048	3	1069	3	1091	3	1113	3	1136	3	1159	3	1182
4	930	4	949	4	969	4	989	4	1008	4	1029	4	1050	4	1071	4	1093	4	1116	4	1139	4	1162	4	1185
5	932	5	951	5	971	5	991	5	1010	5	1031	5	1052	5	1074	5	1096	5	1118	5	1141	5	1164	5	1187
6	934	6	953	6	973	6	993	6	1012	6	1033	6	1054	6	1076	6	1098	6	1120	6	1143	6	1166	6	1189
7	936	7	955	7	975	7	995	7	1014	7	1035	7	1056	7	1078	7	1100	7	1123	7	1145	7	1168	7	1191
8	938	8	957	8	977	8	997	8	1016	8	1037	8	1058	8	1080	8	1102	8	1125	8	1148	8	1171	8	1194
9	940	9	959	9	979	9	999	9	1018	9	1039	9	1061	9	1083	9	1104	9	1127	9	1150	9	1173	9	1196
10	942	10	961	10	981	10	1000	10	1020	10	1041	10	1063	10	1085	10	1107	10	1129	10	1152	10	1175	10	1199

The foregoing Table, which shews the Specific Gravity on the Bulk of the mixture, bears reference to the Table (No. 2) of the Alcoholmeter following.

No. 2.

TABLE, shewing the lbs. of Sugar per Gallon in Cordialized Spirits, with per Centages to be added to the indicated strength per the Alcoholmeter.

Difference of Gravity. lbs. of Sugar per Gallon.		10 4 oz. or 25 to 100	15 6 oz. 37½ to 100	20 8 oz. 50 to 100	25 10 oz. 62½ to 100	30 12 oz. 75 to 100	35 14 oz. 87½ to 100	40 1.0	45 oz. 1.2	50 oz. 1.4	Difference of Gravity. lbs. of Sugar per Gallon.	
Sp. Grav. of Spirit.	Per Cent. of Spirit.										Per Cent. of Spirit.	Sp. Grav. of Spirit.
920	Pf.	1.6	2.5	3.4	4.4	5.3	6.2	7.1	8.1	9.0	Pf.	920
923	2.5	1.6	2.5	3.3	4.3	5.2	6.1	6.9	7.8	8.8	2.5	923
926	5.	1.5	2.4	3.2	4.2	5.1	5.9	6.8	7.7	8.6	5.	926
929	7.5	1.5	2.3	3.2	4.1	4.9	5.8	6.6	7.5	8.4	7.5	929
932	10.	1.4	2.2	3.1	4.0	4.8	5.7	6.5	7.4	8.2	10.	932
935	12.5	1.4	2.2	3.1	3.9	4.7	5.5	6.3	7.2	8.0	12.5	935
938	15.	1.4	2.1	3.0	3.8	4.6	5.4	6.2	7.0	7.8	15.	938
940	17.5	1.3	2.1	2.9	3.7	4.5	5.3	6.0	6.8	7.6	17.5	940
943	20.	1.3	2.0	2.8	3.6	4.4	5.2	5.9	6.7	7.5	20.	943
945	22.5	1.3	2.0	2.7	3.5	4.3	5.0	5.7	6.5	7.3	22.5	945
948	25.	1.2	1.9	2.6	3.4	4.1	4.8	5.5	6.3	7.0	25.	948
950	27.5	1.2	1.9	2.5	3.3	4.0	4.7	5.3	6.1	6.8	27.5	950
952	30.	1.1	1.8	2.4	3.1	3.8	4.5	5.1	5.8	6.5	30.	952
954	32.5	1.1	1.7	2.3	3.0	3.6	4.3	4.8	5.5	6.2	32.5	954
956	35.	1.0	1.6	2.2	2.9	3.5	4.1	4.6	5.3	6.0	35.	956
958	37.5	1.0	1.6	2.1	2.8	3.4	3.9	4.4	5.1	5.8	37.5	958
960	40.	.9	1.5	2.0	2.7	3.2	3.8	4.3	4.9	5.5	40.	960
962	42.5	.9	1.5	2.0	2.6	3.1	3.6	4.1	4.7	5.3	42.5	962
964	45.	.9	1.4	1.9	2.5	3.0	3.5	4.0	4.6	5.1	45.	964
965	47.5	.8	1.4	1.9	2.4	2.9	3.4	3.9	4.4	4.9	47.5	965
967	50.	.8	1.3	1.8	2.3	2.8	3.3	3.8	4.3	4.8	50.	967
969	52.5	.7	1.2	1.7	2.2	2.6	3.1	3.6	4.1	4.5	52.5	969
970	55.	.7	1.2	1.6	2.0	2.4	2.9	3.4	3.8	4.2	55.	970
972	57.5	.6	1.1	1.5	1.9	2.2	2.7	3.1	3.5	3.9	57.5	972
973	60.	.6	1.0	1.4	1.8	2.1	2.5	2.9	3.3	3.6	60.	973
974	62.5	.6	1.0	1.3	1.7	2.0	2.4	2.7	3.1	3.4	62.5	974
976	65.	.5	.9	1.2	1.5	1.8	2.2	2.5	2.8	3.1	65.	976
977	67.5	.5	.8	1.1	1.4	1.7	2.0	2.3	2.6	2.9	67.5	977
979	70.	.4	.7	1.0	1.3	1.5	1.8	2.1	2.4	2.6	70.	979
980	72.5	.4	.7	.9	1.1	1.3	1.6	1.9	2.1	2.3	72.5	980
982	75.	.3	.6	.8	1.0	1.2	1.4	1.6	1.8	2.0	75.	982
983	77.5	.3	.5	.7	.9	1.0	1.2	1.4	1.6	1.8	77.5	983
984	80.	.2	.4	.6	.8	.9	1.0	1.2	1.4	1.6	80.	984
986	82.5	.2	.3	.5	.7	.8	.9	1.0	1.2	1.4	82.5	986
988	85.	.2	.2	.4	.6	.7	.8	.9	1.0	1.2	85.	988
990	87.5	.1	.2	.3	.5	.6	.7	.8	.9	1.0	87.5	990
992	90.	.1	.1	.2	.4	.5	.6	.7	.8	.9	90.	992
994	92.5	..	.1	.2	.3	.4	.5	.6	.7	.8	92.5	994
996	95.	..	..	.1	.2	.3	.4	.5	.6	.7	95.	996
998	97.5	..	..	..	.1	.2	.3	.4	.5	.6	97.5	998

The instrument, in its complete state, is made and sold by Mr. Joseph Long, Little Tower Street. The tables, of which the above is only a portion, and the barometric indicator, have been constructed by him and Mr. Atlee.

24, Bloomsbury Square, Sept. 20th, 1847.

USE OF ANTHRACITE COAL IN LOCOMOTIVE ENGINES.

At the monthly meeting of the Franklin Institute, held June 17th, 1847, the following remarks on the use of anthracite in locomotive engines, were made by Professor W. R. Johnson.

Since the attainment of so complete a success in using anthracite under the boilers of stationary engines, and on board of all our principal river and sound steam vessels, on the Atlantic coast, it has become a subject of much enquiry, to determine why so little success has attended the efforts to introduce it into general use upon railroads. Various trials on the Columbia Road, and others on the Reading Road, have, it is understood, been attended with so little promise of advantage, as to cause, at present, the abandonment of that fuel, and an adherence to wood, as the only available material. The cost of wood, alone, to the Reading Railroad, during the last year, is put down, in the late annual report, at 202,061 dollars, and, as the total quantity of coal brought to market over the road, was 1,188,258 gross tons, we have, after deducting the wood required for passenger and freight trains, an expense of 191,569 dollars, for the wood required to haul that quantity of coal 94 miles, and to take back the empty cars. It is true, that the whole of this coal did not reach tide-water, but the computation is based upon the fact, stated in the report of the Company, that the cost of wood, "per round trip of 188 miles," to haul 360 tons of coal, the above distance, and "back with empty cars," was 14·92 cords, costing 58·04 dollars. It is estimated, by the President of the Railroad Company, that the introduction of anthracite, instead of wood, would save the company 125,000 dollars per annum. Should it save half this sum, it is evident that great outlays, to effect the purpose, would be warranted, and, consequently, the efforts heretofore made would be fully justified. Mr. Nichols, the engineer, and general superintendant of the Reading Road, has been, for some time, engaged in an effort to accomplish this object, by placing the engine and boiler on separate carriages, with a view to an enlargement of the fire surface of the latter. Mr. N. has, in fact, used an ordinary locomotive, to which he has attached, on a separate truck, a boiler 16 feet long and 4½ feet wide, with a semi-cylindrical arch running the whole length. This is connected, by jointed pipes, with the engine. The blast is created by a fan, driven by a small engine. The escape steam is thrown into what was the original boiler of the locomotive engine, which is still retained, for the double purpose of serving as a *condenser*, and of making weight on the driving-wheels. If this plan of condensation shall be found available, much time will be saved which is now consumed at water stations, as a large portion of the water will be constantly circulating.

So important to the Reading Railroad has this item of expenditure of *fuel* become, that, during the past year, efforts have been made by the company to manufacture an artificial fuel, with a basis of anthracite, as a substitute for wood. In this they are understood to have so far succeeded, as to have made some trips with it. But still the desideratum is the use of anthracite alone.

Having several times, within seven or eight years, witnessed the exclusive use of anthracite in all the locomotives on the Beaver Meadow and Hazleton Railroads, making round trips of thirty or forty miles, I have felt much interest in tracing the causes of ill success elsewhere.

From all the enquiries which I have been able to make, the following appear to be regarded as the chief impediments to the use of anthracite in locomotives.

1. The want of rapid ignition, and free, lively combustion.

2. The intense concentrated local heat, which is said to destroy the grate-bars, to attack the rivets and lapse of the fire-box, and even to cause blisters to rise in the plates of which it is composed; and, finally, to fuse the ashes into a troublesome clinker.

3. The sharp, angular particles of coal projected, by the violent fitful blast of the escape-steam, obliquely into the ends of *copper* tubes, cuts them away within a few inches of the fire end. In the upper range of tubes it is the upper side which is chiefly attacked, and, as might be anticipated, in the lower ranges, the lower sides are most worn away. The effect of this cutting is usually limited to four or six inches of the length of the tubes.

4. The difficulty of fitting in iron tubes, so as to make perfect joints, and, at the same time, avoid irregularity in the form of the heads, and loosening one tube while another is fastened.

As the first of the above difficulties—the want of proper activity in the fire—has been completely overcome in our steamboats, by the use of a steady fan blast, it seems that an equivalent blast in the locomotive ought to produce the same effect. The irregular fitful current generated by the waste steam, is not in all respects an equivalent to the blast of a fan; but when that blast is equalized, by projecting the escape steam first into a receptacle of considerable magnitude, and then through a number of small pipes equally distributed over the area of the chimney, the blast is so nearly equable as to answer completely the purpose of sustaining the fire in brisk and uniform activity. This method of disposing of the escaping steam, originally invented by Mr. Gurney, and applied in common road engines to prevent the frightening of horses, by the sudden violent belching sound, was first introduced here by Mr. Hopkins Thomas, now of Beaver Meadow, while a workman in the employ of Messrs. Eastwick and Harrison. His object was a steady blast, not the mere avoidance of disagreeable noise.

The steam-box used to equalize the draught is cylindrical, 12 inches in diameter, and 11 inches deep; two tubes, each three inches in diameter, flanched at the opposite ends to the steam chests of the two cylinders of the locomotive, support the box in the interior of the dust chamber, and convey the escape steam to its centre. A lid, ground to fit the top of the steam-box, has 18 jet pipes rising two or three inches from its upper surface, and drawn in at the top to a diameter of half an inch. These are placed just beneath the base of the chimney, and their purpose is to distribute the escaping steam throughout the chimney, and, by limiting, to some extent, the rapidity of flow, to maintain within the box a pressure *approaching* to uniformity.

Messrs. Eastwick and Harrison founded, on a division of the receptacle into two parts, a patent, which they applied in some engines built by themselves. But as this evidently tended to make the action of the steam upon the air of the chimney in a degree partial and fitful again, the Beaver Meadow and Hazleton Companies discarded this modification of Gurney's plan, and in all their engines, which have constantly used anthracite for the last eight or nine years, the draught is ample, the combustion regular, and the evaporation vigorous and well sustained. The fire is, of course, *kindled* with wood, and when this is well ignited, anthracite is added by little at a time, usually not more than a single shovel full, and in lumps, commonly not above six inches in diameter. If larger than this, they would remain too long in mass, dark and ineffectual; if small egg or nut coal alone were used, it would, it is alleged, by the jarring of the locomotive, spread over the whole fire at once, and check the evaporation. While under way, the bed of coal upon the grate is kept at a thickness of five, or at most, six inches. When fresh coal is added, care is taken that a single shovel-full only is put on at once, and that this is thrown on the part which appears thinnest. Much experience in watching the indications of a manometre, while generating steam by anthracite, enables me fully to appreciate the importance of these practical precautions. In some of the attempts to use anthracite on the Reading Railroad, a bed of 18 inches thick is said to have been allowed to accumulate on the grate. In such cases, the whole engine is said to have become excessively overheated, and a flame to have passed out at the chimney. This is easily understood, when we consider that, in passing through so thick a mass of hot coal, the carbonic acid at first formed (CO_2) by taking up a second proportional of carbon, becomes $CO+CO$, or two proportionals of carbonic oxide. The atmospheric air to ignite this compound, gains admittance partly through the chinks of the fire door, and the dust-box door, and is partly found near the chimney top, where the intermitting blast through a single jet pipe, keeps the chimney alternately receiving and emitting air.

The second evil, that resulting from the highly concentrated heat, has been found much more serious than the preceding.

Grate-bars were burned out in a few weeks. Capt. A. H. Vancleve, who had charge of the Beaver Meadow Road, states that, at one period, wrought iron bars were substituted for cast, but that it required two smiths' fires to be in constant employ, to make grate-bars for four locomotive engines. The secret of preventing this occurrence, was stated, by a gentleman at Hazleton, to have been discovered by accident. A boulder, which had rolled from a slope upon the track of the railroad, tore off the ash box of the first engine which passed. As the damage did not interfere with the running of the engine, and as it was not convenient, for some days, to return to the machine shop, it was permitted to continue its trips for some days, without an ash box. The overheating and wasting of grate-bars were so manifestly obviated during the time, as to attract immediate attention. Ash boxes were successively removed from other engines, and, from the adoption of this alteration to the present time, the destruction of grate-bars has ceased to be a source of serious inconvenience. A set in the locomotive Franklin were put in in June, 1846, and were in use, and in good order, at the end of May, 1847.

It might be supposed that the wooden superstructure of the road, and particularly that of bridges, would be endangered by the constant falling of sparks. In the main, it may be said, that this evil at length cures itself; for both road and bridges, except the rails, become covered with a stratum of cinder, and fine particles of coal, which effectually defends all beneath from danger of igniting by particles of hot matter from the grate. Unlike particles of ignited charcoal, these are, from their very weight, not liable to be easily raised and blown about by the currents of air created by the cars, which pass over them after they reach the road. Hence, the only precaution which has been found necessary is, to place two sheets of iron one on each *side* of the bottom of the fire box, extending downwards about nine inches, and sloping inwards, to confine the falling cinders to the central part of the track. At first a watch was established at the bridges, but when the roadway became covered with cinder, there was found to be very little danger from this source. The Hazleton and Beaver Meadow Roads have wooden rails, laid with flat iron bars; where edge or T rails are used, the danger would be manifestly less than in the case of these roads, which have so long used anthracite without detriment.

The concentrated heat of anthracite fires generally affects injuriously only the laps and rivets of the fire box, unless the iron of that part of the boiler be of inferior quality. Hence the importance of selecting the very best of iron for the fire box, and the probable utility, as suggested by Capt. Vancleve, of subjecting it to a high temperature before using any plate for this purpose, in order to detect blisters or imperfect weldings, if such exist in the interior. The number of pieces used in the lower part of a fire box, ought to be the least possible, and the horizontal laps ought not to have their edges presented downwards to the action of the rising flame. I see no practical difficulty in the way of rolling sheets 18 inches wide, long enough to form the entire circuit of the lower part of a fire box. Above that height there would be no danger from this peculiar action of the fire. Nor do I know of any serious objection to welding together the ends of such a sheet, especially if made three-eighths of an inch, or more, in thickness,—and thus forming a band in which not a single joint or rivet should come in contact with the fire. All other parts of the boiler would still be made in the ordinary manner.

The locomotive Lehigh commenced running on the Hazleton Road in 1838. In 1844 it was found necessary to renew a space of about 18 inches in the lower part of the fire box; and this is the only repair which that part has undergone since the engine was put upon the road I examined it in the latter part of May, 1847, and found the iron, to all appearance, sound and good, with no leaks at the rivets, or elsewhere. Three or four of the upper rows of tubes in this engine have been in use since 1839, and the rest were renewed about two years ago.

To avoid the conversion of ashes into clinker, those anthracites should be selected which are free from slaty plies, and which contain the least of sulphuret of iron, or other fusible impurities. Should any inconvenience be found from clinker, on a prolonged trip, it could easily be removed at a watering station, by means of a forked fire hook adapted to that peculiar service. A small supply of wood may be carried, for re-kindling, in case of unusual delays, But the experienced fireman will always be careful to clear coal and clinker from his grate, before he attempts a renewal with wood.* Grates may be hinged, with a view to the prompt discharge of their contents, and, with that facility, the re-kindling with wood may take place even without stopping the engine, especially if advantage be taken of a favorable grade of the road.

The third point of difficulty—that resulting from the cutting away of copper tubes, is fully obviated by the substitution of iron, with the further advantage of economy in the first cost. But this brings us to the fourth and last difficulty—that of securing iron tubes to the heads of the boiler.

This has been attempted in several different ways. One consists in cutting a screw at each end of the tube, to enter corresponding threads cut in the heads of the boiler, and then riveting over the projecting edges of the tubes. That on which Mr.

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* This, and the succeeding precaution, are suggested by Capt. Vancleve,

Baldwin has founded a patent, consists in brazing a short piece of copper tube to each end of the iron one, and then connecting the former with the head of the boiler, in the same manner as he puts in copper tubes. But that which seems the most simple, and which is quite effectual, as proved at Beaver Meadow and Hazleton, for a course of years, is the turning off of the iron tubes, on the outside, at each end, in the form of the frustrum of a cone, to the distance of seven-tenths of an inch, by which the thickness of the tube at the extremity is reduced about one-half. This conical part receives a ring of copper, cylindrical within, conical without, and about half an inch wide, which, after the iron tube has been inserted in its place, is driven on to its conical termination, filling the space between it and the edge of the aperture in the head of the boiler. This copper ring, by its wedging effect, tightens the iron tube; forms a close joint, and allows the edge of the iron tube to be slightly opened out, and riveted, to form a very perfect juncture. The language used in describing the result of this mode of fitting in the tubes, was, that the "joints never leaked a drop." In rare instances, the welding of a tube (made by the same process as gas tubes) is found slightly defective; but this does not long put a stop to the use of the engine, for a very little labor suffices to tap a screw in each end, and plug up a single defective tube, till a convenient opportunity occurs for its removal. To clear dust of anthracite from the tubes, a species of screw auger, with a sharp edge like that of a chisel, is occasionally employed.

The quantity of anthracite commonly used in a round trip of 30 miles, on the Hazleton Road, is from a ton to a ton and a half, hauling 35 to 40 cars, and conveying from 100 to 120 tons of coal. The grades on this road are heavy,—60, 80, and 140 feet per mile,—all in the direction of the trade. The severest labor is, consequently, encountered in taking back the empty trains. In two experiments, conducted by Capt. Vancleve, over the Beaver Meadow Road, reducing its grades by Pambour's formula to the condition of a level, he found that the seven ton engine required 1½ pounds of anthracite per ton, per mile, of *freight and cars* hauled, and the thirteen ton engine took but one pound for the same labor. The small engine was subject to slipping of its wheels on the high grades, which, of course, impaired the efficiency of its fuel.

Those who are most familiar with this subject, attribute to the early, persevering, and well directed efforts of the Hon. Samuel D. Ingham, formerly President of the Beaver Meadow Railroad Company, much of the credit of urging on to final success, the experiments which have proved so important to the interests of that coal region.—[*Franklin Journal.*]

REPORT OF AMERICAN PATENTS.

From the "Journal of the Franklin Institute."

BY MR. C. M. KELLER.

To **WILLIAM BULLARD,** *assignee of Royal E. House, New York City, for an improvement in the filter.*

THIS is a filter and cock combined,—the pipe and spout are one, and in the tube thereof there is an oblique partition, with a hole through the pipe on each side of the partition. This part of the pipe is surrounded by a case that is fitted by collars, &c., to turn thereon, and this case is divided into two concentric chambers, by a filtering medium. The water to be filtered passes along the pipe until it strikes the partition, it then passes through one of the holes, and through a tube to the outer chamber, and, after passing through the filtering medium into the inner chamber, runs in through the other hole into the spout on the outer side of the partition. By turning the case on the tube, the supply holes are closed, and the flow of water stopped.

Claim :—"The patentee claims the combination of the partition pipe with the chambers, by means of the tubes, in the manner and to produce the effect above pointed out."

To **WARREN DUTCHER,** *of Bennington, Vermont, for improvements in power looms.*

THE nature of this invention consists in connecting each driving-shaft with the shuttle-box, by means of a joint-link, jointed to the shuttle-box and to the staff, about the middle of its length; the staff also rests against a roller near its lower end, to admit of its moving up and down, and to answer the purpose of a fulcrum, for drawing back the staff, by means of a strap attached to a spring and to the end of the staff below the roller,—the lower ends of the two staffs being connected by the same spring, the tension of which is so regulated, that when one staff is thrown back it has strength enough only to carry back the other staff about half way, where it remains until the shuttle is driven back, which distends the spring and causes this staff to move back as the shuttle reaches it; and which, therefore, gradually arrests it.

Claim :—"I claim as my invention, combining the driving or wag-staffs with the shuttle boxes, by means of the joint-links, as herein described, for the purpose of causing the end that drives the shuttle without a picker to move parallel with the race-board, or nearly so, during its vibration."

"And I also claim connecting the lower end of the two staffs below their fulcra, by means of a spring having an intermittent action for drawing them back, in combination with the application of a positive motion above, for driving the shuttle; whereby the returning staff aids in arresting the momentum of the shuttle."

To SAMUEL PIERCE, *of Peekskill, New York, for an improvement in the stove for heating apartments.*

THE patentee says,—"The nature of my invention consists in providing the sides of the fire-place with a chamber on each side, provided with apertures to receive atmospheric air from the room, which, after being highly heated by circulation, is discharged in small jets from one of them, through apertures into the fire chamber, above the fuel, to consume the combustible gases evolved from the fire, while in a highly heated state,—and from the other, below the grate, to supply heated air for the combustion of the fuel; and also, in combining therewith, a damper or register, to admit cold air under the grate to regulate the combustion."

The patentee's claim is for combining with the fire-chamber of a stove a chamber or chambers, pierced with small holes, to discharge the air that is highly heated in passing through them below and above the fire, for the purpose and in the manner substantially as herein described. And he also claims, in combination with this mode of supplying heated air to the fuel and products of combustion, the damper or register, for admitting cold air to the fuel when desired, to regulate the combustion, as described.

To M. VASSER, *of Poughkeepsie, New York, for a vent-plug and cork, for bottles and other vessels containing fermenting liquids.*

THE patentee says,—"It is known that vessels containing fermenting liquors frequently burst, from the great pressure of the gases generated by the fermentation within, and, with the view to prevent this, I have invented a vent-plug or stopper (to be applied to all such vessels), provided with a cap that covers the aperture or vent; which cap is connected and held down by means of a strip or strips, or threads of India-rubber, attached to the lower end of the plug or stopper, and passing up through the aperture thereof, so that the vent is kept air-tight by the tension of the India-rubber, until the pressure of the gases within become so great as to endanger the safety of the vessel, and superior to the tension of the India-rubber; when the cap is lifted by the escaping gases, to relieve the vessel, and then closed again. And, as the cap cannot be opened until the pressure of the gases becomes greater than that of the atmosphere, added to the tension of the India-rubber, it is evident that atmospheric air cannot enter to vitiate the liquid."

Claim:—"What I claim as my invention, and desire to secure by letters patent, is the spring cap, in combination with the vent-plug or stopper, as herein described."

LIST OF REGISTRATIONS EFFECTED UNDER THE ACT FOR PROTECTING NEW AND ORIGINAL DESIGNS FOR ARTICLES OF UTILITY.

1847.

Sep. 28. *Thomas Wharton*, of Birmingham, for the Victoria taper.

30. *Foster, Porter, & Co.*, of 124, Wood-street, Cheapside, London, for a cravat.

Oct. 1. *Richard Holland & William Turner*, of Bower Works, Sheffield, for a file.

4. *John Johnson*, of New Bond-street, Leicester, for a waistcoat band or strap.

4. *John Froggatt*, of Lenton, Nottingham, manufacturing chemist, for an improved dropping dibble.

5. *Smith, Beard, & Co.*, of 111, Cheapside, London, for a fastening for shirt collars, &c.

6. *John Slate*, of 4, Belmont-place, Wandsworth-road, accountant, for the Vauxhall pneumatic chimney top and smoke spreader.

6. *Henry Doulton*, of Lambeth Pottery, Lambeth, for an egg-shaped sewer.

7. *Paul Garbanati*, of 91, Newman-street, Oxford-street, for the "refractio reflexa."

8. *George Wilson*, of the Glass Works, York, for an improved stopper.

9. *John Rodgers & Son*, of the India-rubber Works, Broad-street, Birmingham, for a non-metallic flexible connector, for garters, braces, and waistcoat backs.

9. *Laidlaw & Sons*, of Simon's-square, Edinburgh, for the economic gas stove.

9. *Edwin Sherwood*, of Birmingham, for a fastening for a button case.

9. *Joseph Horatio Cutler*, of Birmingham, for a hook for fastening articles of dress.

9. *Edward Varney Pledge*, of 311, Cheapside, Birmingham, for a papier-maché handle for whips.

11. *Henry Bigg & Son*, of 29, Leicester-square, London, for an improved truss for hernia.

12. *Thomas Debenham Mills*, of 11, Frederick-place, Goswell-road, for a measuring machine.

12. *John Strafford*, of Stratford, Essex, for a tricolored railway lamp.

12. *William Smith*, of Gresham-street, for a safety pin and needle box.

12. *Bloomer & Phillips*, of 13, Rockingham-lane, Sheffield, manufacturers of joiners' tools, for a spring-brace pad, with lever thumb-bit.

12. *Thomas Tring*, of 25, Norfolk-street, Lower-road, Islington, brush maker, for a decanter brush.

Oct. 14. *Isaac Dodds*, of Glasgow, civil engineer, for a rail straightening machine.

14 *Thomas Key*, of Charing-cross, London, military instrument maker, for an improved clarionet.

15. *Collard & Collard*, of 26, Cheapside, London, for a square pianoforte.

16. *Charles Rowley*, of Birmingham, for a cigar lighter and ash pan.

19. *Charles & James Yorke*, of 6, Bennett-street, Cambridge, for a revolving easy chair.

21. *John Rock Day*, of 8, Spring Cottages, Hill-street, Walworth, and *William Benjamin Denton*, of 26, Bolingbroke-row, Walworth, for a handle for tailor's goose or other iron.

21. *Henry Samuel Ellis*, of 200, High-street, Exeter, for a safety chain brooch.

22. *John Cherry*, of 34, Murray-street, City-road, for a candle lamp spring detainer.

22. *William Smith*, of 69, Princes-street, Haymarket, for a wrench or spanner.

25. *Henn & Slater*, of 231, Cheapside, Birmingham, manufacturers of umbrella and parasol furniture, for umbrella and parasol furniture.

25. *Charles F. A. Rider*, of 61, Red-cross-street, Borough, for an expanding and contracting hat lining.

25. *James Bates*, of 7, Derby-road, Kingsland-road, for a tooth brush.

26. *Captain George Smith, R.N.*, for a marine life and property preserver.

28. *Charles Iles*, of Bordesley, Birmingham, for a hook.

List of Patents

That have passed the Great Seal of IRELAND, from the 17th September to the 17th October, 1847, inclusive.

To Francis Bowes Stevens, of Hoboken, in the county of Hudson, in the State of New Jersey, in the United States of America, engineer, for an invention of improvements in applying apparatus to ships and vessels, to improve their speed,—being partly a foreign communication.—Sealed 27th September.

Joseph Gray, of Redcross-street, Southwark, machinist, for improvements in gas-meters.—Sealed 27th September.

William Bacon and Thomas Dixon, both of Bury, in the county of Lancaster, engineers, for certain improvements in steam-engines.—Sealed 5th October.

Stephen White, of No. 30, Winchester-row, New-road, in the parish of Marylebone, in the county of Middlesex, clerk in the employ of the Great Western Railway Company, for a new means of producing gas, both as to apparatus and materials from which the gas is produced.—Sealed 15th October.

Abraham Walker Craig, merchant, and John Patterson, Gent., both of Belfast, in the county of Antrim, for improvements in power looms for dressing and weaving linen.—Sealed 16th October.

William Broadbent, of Manchester, and of Little Lever, both in the county of Lancaster, paper-manufacturer and dealer, for improvements in the manufacture of paper.—Sealed 16th October.

List of Patents

Granted for SCOTLAND, subsequent to September 22nd, 1847.

To Anthony Bernhard Von Rathen, of Putney, in the county of Surrey, engineer, for certain universal wheels, or improved direct rotary engines, to be worked by steam, air, or any other elastic power.—Sealed 27th September.

George Dodge, of Attleborough, in the state of Massachusetts, in the United States of America, for certain new and useful improvements in machinery for spinning and winding yarn.—Sealed 27th September.

Nathaniel Card, of Manchester, in the county of Lancaster, candle-wick maker, for certain improvements in machinery or apparatus for twisting, twining, or manufacturing cords, bands, twines, and other similar articles, from cotton, flax, hemp, silk, and other fibrous substances.—Sealed 28th September.

Sydney Smith, of the town and county of the town of Nottingham, engineer, for a certain improved apparatus for determining the pressure of steam in boilers, and regulating the dampers of a furnace.—Sealed 30th September.

Joseph Henry Tuck, of Paris, in the kingdom of France, Gent., for improvements in apparatus for ventilating buildings, carriages, chimneys, and other places, where a change of air is required.—Sealed 4th October.

James Napier, of Shacklewell-lane, in the county of Middlesex, operative chemist, for improvements in smelting copper and other ores.—Sealed 7th October.

Thomas John McSweny, of Gould-square, in the city of London, Gent., for improvements in steering ships and other vessels.—Sealed 7th October.

William Hutchison, of No. 3, Wakeling-terrace, in the parish of St. Mary, Islington, in the county of Middlesex, marble merchant, for improvements in processes for hardening, polishing, coloring, and rendering stone impermeable;—applicable also to other substances,—being a foreign communication.—Sealed 12th October.

William Tharpe Stevenson, of Upper Baker-street, Lloyd-square, in the county of Middlesex, Gent., for improvements in regulating the generating of steam in steam-boilers.—Sealed 12th October.

Robert Stirling Newall, of Gateshead, in the county of Durham, for certain improvements in machinery for grinding grain, paints, and other substances.—Sealed 21st October.

John Lane, of Oriel-street, Liverpool, brewer, for improvements in railway carriages and engines.—Sealed 21st October.

New Patents

SEALED IN ENGLAND.

1847.

To Thomas Moore, of Burnley, Lancashire, manufacturer, for certain improvements in looms for weaving. Sealed 30th September—6 months for inrolment.

William Edward Newton, of the Office for Patents, 66, Chancery-lane, Middlesex, civil engineer, for improvements in machinery for the manufacture of nets and netting,—being a communication. Sealed 30th September—6 months for inrolment.

Richard Johnson, of Manchester, wire manufacturer, for certain improvements in the manufacture of wire cloth. Sealed 30th September—6 months for inrolment.

Charles de la Salzede, of Paris, Gent., for improvements in brassing and bronzing the surface of steel, iron, zinc, lead, and tin. Sealed 30th September—6 months for inrolment.

Robert Hawkins Nicholls, of Thurlby Grange, Bourne, in the county of Lincoln, Gent., for improvements in machinery for distributing corn and other grain on land; and also improvements in giving motion to agricultural and other machinery. Sealed 30th September—6 months for inrolment.

Ignacio de Barros, of Lisbon, in the kingdom of Portugal, Gent., for improvements in machinery for making lasts for boots and shoes, butts or stocks for fire-arms, and other irregular forms,—being a communication. Sealed 30th September—6 months for inrolment.

Charles Jay, of Bathurst-street, Hyde-park-gardens, Middlesex, for certain improvements in apparatus for evaporating and concentrating saccharine and saline solutions; and which may also be applicable to the evaporation and concentration of vegetable and other extracts. Sealed 30th September—6 months for inrolment.

Pierre Auguste Bapaume, of No. 11, Rue du Croissant, Paris, Gent., for a new process for the preparation and engraving of plates, adapted to the printing of cotton, stuffs, paper, and other substances. Sealed 7th October—6 months for inrolment.

Nathaniel Fortescue Taylor, of 119, Vauxhall-walk, Lambeth, Surrey, engineer, for improvements in machinery for printing and staining paper and other fabrics. Sealed 7th October—6 months for inrolment.

Joseph Nye, of Alfred-place, Saint George's, Southwark, Surrey, for improvements in machinery for driving piles, and raising earth and fluids. Sealed 7th October—6 months for inrolment.

James Pearson, of Montague-terrace, New Cross, engineer, for improvements in locomotive engines and carriages. Sealed 7th October—6 months for inrolment.

Alexander Bain, of Wilderness, Hampton Wick, Middlesex, Gent., for improvements in musical instruments, and in the means of playing on musical instruments. Sealed 7th October—6 months for inrolment.

Sir Samuel Brown, of Vanburgh Lodge, Blackheath, Kent, Knight of the Hanoverian Guelphic Order, and Captain in Her Majesty's navy, for improvements in propelling and steering vessels; and improvements in the mariner's compass. Sealed 7th October—6 months for inrolment.

George H. Dodge, of Attleborough, in the State of Massachusetts, of the United States of America, for certain new and useful improvements in machinery for spinning and winding yarn. Sealed 7th October—6 months for inrolment.

Thomas Hunt Barber, of King-street, Cheapside, London, Gent., for improvements in machinery for propelling vessels,—being a communication. Sealed 7th October—6 months for inrolment.

John Tyrrell, of Great Ormond street, Queen-square, Middlesex, Esq., for certain improvements in the manufacture of elastic fabrics, from vulcanized India-rubber, gutta-percha, or certain fibrous materials,—being a communication. Sealed 7th October—6 months for inrolment.

James Hartley, of Sunderland, glass manufacturer, for improvements in the manufacture of glass. Sealed 7th October—6 months for inrolment.

Jules Jean Baptiste Martin de Lignac, of Portland-street, Middlesex, Gent., for improvements in preserving milk. Sealed 7th October—6 months for inrolment.

Alfred Vincent Newton, of the Office for Patents, 66, Chancery-lane, Middlesex, mechanical draughtsman, for certain improvements applicable to the construction of floors and other parts of buildings, and also to certain kinds of furniture and fittings for buildings,—being a communication. Sealed 7th October —6 months for inrolment.

Pierre Antoine Joseph Dujardin, of Lille, France, M.D., for improvements in electro-magnetic telegraphic apparatus. Sealed 7th October—6 months for inrolment.

Matthew Pierpoint, Esq., of Worcester, for certain improvements in the distribution of artificial light. Sealed 7th October—6 months for inrolment.

Samuel Cunliffe Lister, Gent., and Isaac Holden, worsted spinner, both of Bradford, for improvements in carding, preparing, combing, and spinning wool, and other fibrous substances, and also in making heald and Genappe yarns. Sealed 7th October—6 months for inrolment.

Richard Fell, of Winchester-street, London, engineer, and James Fell, of Ostend, Belgium, Gent., for certain improvements in obtaining and applying motive power. Sealed 7th October—6 months for inrolment.

Charles Frederick Ellerman, of Brompton, Middlesex, for certain processes or methods of rendering feculent, excremental, and other matters, inodorous and disinfecting; and also of retarding the putrefaction of animal and vegetable substances; and certain chemical re-agents employed in the said processes or methods. Sealed 7th October—6 months for inrolment.

Matthew Townsend, of the borough of Leicester, framework-knitter, for improvements in the manufacture of looped or knitted fabrics. Sealed 7th October—6 months for inrolment.

Bartholomew Beniowski, *of* Bow-street, Covent Garden, Middleent, for certain improvements in the apparatus for, and process of, printing. Sealed 14th October—6 months for inrolment.

Sir John Scott Lillie, of Fulham, Middlesex, Knight Companion of the Bath, and Lieutenant Colonel in Her Majesty's army, for improvements in machinery applicable to tillage, and for other agricultural purposes. Sealed 14th October—6 months for inrolment.

Joseph Maudslay, of Lambeth, in the county of Surrey, engineer, for certain improvements in the manufacture of candles, part of which improvements are applicable to the manufacture of other mouldable substances. Sealed 14th October—6 months for inrolment.

Alfred Vincent Newton, of the Office for Patents, 66, Chancery-lane, Middlesex, mechanical draughtsman, for improved machinery for blooming iron. Sealed 14th October—6 months for inrolment.

Arthur Wall, of India-row, East India-road, Middlesex, surgeon, for a new or improved apparatus for and method of separating oxides from their compounds and each other,—being a communication. Sealed 14th October—6 months for inrolment.

Thomas Horne, of Birmingham, for certain improvements applicable to carriage-windows. Sealed 14th October—6 months for inrolment.

John Thong Hamailine, of Hollywell-cum-Needingworth, in the county of Huntingdon, farmer, for an improved agricultural instrument for preparing lands in various ways for agricultural purposes. Sealed 14th October—6 months for inrolment.

William Ayre, the younger, of the borough of Kingston-upon-Hull, Attorney at Law, for improvements in the method of propelling vessels. Sealed 14th October—6 months for inrolment.

Robert Stirling Newall, of Gateshead, Durham, for certain improvements in machinery for grinding grain, paints, and other substances. Sealed 14th October—6 months for inrolment.

Matthew Curtis, of Manchester, machinist, for certain improvements in machines used for preparing to be spun, and spinning cotton and other fibrous substances, and for preparing to be woven, and weaving such substances when spun. Sealed 14th October—6 months for inrolment.

David Fisher, of Clerkenwell-green, Middlesex, boot-maker, for certain improvements in the manufacture of boots and shoes. Sealed 14th October—6 months for inrolment.

Francis Lloyd, of Snow-hill, tobacco manufacturer, for certain improvements in the preparation and manufacture of tobacco. Sealed 14th October—6 months for inrolment.

Charlton Henry Sloman, of St. Martin's-lane, Middlesex, professor of music, for improvements in apparatus used for ironing. Sealed 21st October—6 months for inrolment.

Patrick Playfair, merchant, and Laurence Hill, civil engineer, for improvements in the manufacture of sugar. Sealed 21st October—6 months for inrolment.

Robert Richardson Banks, of Great George-street, Westminster, architect, for a new method of artificially curing and preserving the berries of coffee by a drying apparatus. Sealed 21st October—6 months for inrolment.

Brooke Smith, of Birmingham, and Richard Ford Sturges, of Birmingham aforesaid, manufacturers, for a certain improvement, or certain improvements, in apparatus for filtering. Sealed 21st October—6 months for inrolment.

James Neville, of Walworth, Surrey, civil engineer, for certain improvements for conveying goods and passengers on railroads—parts of such improvements being applicable for working or driving other descriptions of machinery. Sealed 21st October—6 months for inrolment.

Thomas Forster, of Streatham, Surrey, manufacturer, for improvements in combining gutta-percha with certain materials, and in the application thereof to waterproofing fabrics; and in the moulding various articles therefrom; in finishing the surface of articles made from gutta-percha, or gutta-percha combined with other materials; and in cleansing gutta-percha. Sealed 21st October—6 months for inrolment.

William Gostwyck Gard, of Calstock, in the county of Cornwall, engineer, for certain improvements in machinery or implements for boring and sinking. Sealed 21st October—6 months for inrolment.

John Ridgway, of Cauldon-place, Staffordshire, china manufacturer, for certain improvements in the manufacture of paste-boxes and other similar articles, in china and earthenware, or other plastic materials. Sealed 21st October—6 months for inrolment.

Richard Shaw, of Golds-green, West Bromwich, Staffordshire, railway bar finisher, for improvements in the manufacture of wrought-iron railway bars, and railway chairs. Sealed 21st October—6 months for inrolment.

Edmund Tattersall, of Newmarket, land surveyor, for improvements in making communications from one part of a railway train to another. Sealed 21st October—6 months for inrolment.

William Kirrage, of Warner-place, Hackney-road, Middlesex, builder, for an improved combination of materials for building purposes, and a new application of certain materials for building purposes. Sealed 22nd October—2 months for inrolment.

Edward Barker, of Budleigh Salterton, in the county of Devon, Gent., for certain improvements in the preparation of manure. Sealed 26th October—6 months for inrolment.

William Thomas, of Cheapside, in the city of London, merchant, for certain improvements in the construction of stays, and in the machinery for manufacturing stays,—parts of which machinery are applicable to other species of weaving,—being a communication. Sealed 26th October—6 months for inrolment.

George Petrie, of 14, Mountford-street, Whitechapel, Middlesex, for certain improvements in electric telegraphic apparatus. Sealed 26th October—6 months for inrolment.

Charles Carey, of Churchyard-row, Newington Butts, Surrey, Gent., for improvements in obtaining infusions or extracts from coffee and other matters. Sealed 26th October—6 months for enrolment.

Disclaimer and Amendment

OF PART OF AN INVENTION

MADE UNDER LORD BROUGHAM'S ACT.

Disclaimer allowed on the 11th October, 1847, (filed on the 15th October, 1847) to the specification of a patent dated 16th April, 1847, granted to James Robson, of Dover, in the county of Kent, engineer, for a new and improved instrument, to be used in crushing or expressing oil from vegetable and other substances, and in making oil-cake; and which instrument is applicable to the moulding, pressing, and manufacturing the same, and other articles, from plastic materials.

CELESTIAL PHENOMENA FOR NOVEMBER, 1847.

D.	H.	M.	
1			Clock after the ☉ 16m. 16s.
	—		☽ rises morn.
	—		☽ passes mer. 7h. 0m. M.
	—		☽ sets 1h. 56m. A.
2			Occul. 9 Leonis, im. 16h. 6m. em. 17h. 6m.
	—		Occul. 76 Leonis, im. 17h. 16m. em. 18h. 31m.
3	16	50	♃'s first sat. will im.
4	1	57	☿ greatest hel. lat. S.
	11		☽ in Apogee
	3	15	♀ in conj. with the ☽ diff. of dec. 1. 5. S.
5			Clock after the ☉ 16m. 16s.
	—		☽ rises 4h. 3m. M.
	—		☽ passes mer. 9h. 51m. M.
	—		☽ sets 3h. 30m. A.
	10	46	♃' second sat. will im.
	11	18	♃'s first sat. will im.
	15	4	♃'s fourth sat. will im.
	4	8	☿ greatest elong. 23. 4. E.
7	13	23	♃ stationary
8	3	11	Ecliptic conj. or ● new moon
8	6	48	♀ at greatest brilliancy
9			Pallas in perihelion
	12	55	☿ in conj. with the ☽
10			Clock after the ☉ 15m. 56s.
	—		☽ rises 9h. 9m.
	—		☽ passes mer. 1h. 41m. A.
	—		☽ sets 6h. 10m. A.
	7	48	♄ stationary.
12	13	11	♃'s first sat. will im.
		23	♃ second sat will im.
13	0	28	♀ in the ascending node
14	9	15	♃'s third sat. will im.
	12	21	♃'s third sat. will em.
15			Clock after the sun 15m. 16s.
	—		☽ rises 0h. 48m. A.
	—		☽ passes mer. 5h. 58m. A.
	—		☽ sets 11h. 17m. A.
	6	15	☽ in □ or first quarter
	16	41	☿ stationary
16	8	36	♄ in conj. with the ☽ diff. of dec. 4. 57. S.
17			Mer. R.A. 16h. 39m. dec. 23. 55. S.
	—		Venus R. A. 12h. 42m. dec. 8. 53. S.
	—		Mars R. A. 2h. 1m. dec. 12. 11. N.
	—		Vesta R. A. 17h. 1m. dec. 21. 16. S.
	—		Juno R. A. 19h. 39m. dec. 14. 18. S.
	—		Pallas R. A. 10h. 8m. dec. 15. 20. S.
	—		Ceres R. A. 11h. 16m. dec. 14 21. N.
	—		Jupiter R. A. 7h. 28m. dec. 21. 58. N.
	—		Saturn R.A. 22h. 34m. dec. 11. 2. S.
17			Georg. R. A. 0h. 55m. dec. 5. 14. N.
	—		Mercury passes mer. 0h. 55m.
	—		Venus passes mer. 20h. 57m.
	—		Mars passes mer. 10h. 15m.
	—		Jupiter passes mer. 15h. 42m.
	—		Saturn passes mer. 6h. 50m.
	—		Georg. passes mer. 9h. 10m.
18			Occul. ι Piscium, im. 4h. 16m. em. 4h. 49m.
18	21	53	♅ in conj. with the ☽ diff. of dec. 0. 9. S.
19	6	56	♂ in the ascending node
	15	4	♃'s first sat will im.
	15	59	♃'s second sat. will im.
20			Clock after the ☉ 14m. 16s.
	—		☽ rises 3h. 19m. A.
	—		☽ passes mer. 10h. 27m. A.
	—		☽ sets 4h. 27m. M.
	—		Occul. 38, Arietis, im. 16h. 16m. em. 17h. 8m.
	5		☽ in Perigee
		5	♂ in conj. with the ☽ diff. of dec. 2. 7. N.
21	9	8	♃'s first sat. will im.
	13	3	♃'s third sat. will im.
22	10	4	Ecliptic oppo. or ○ full moon
	9	40	♃'s fourth sat. will im.
	12	16	♃'s fourth sat. will em.
23	1	26	☿ in the ascending node
	—		Occul. 111 Tauri, im. 5h. 29m. em. 6h. 9m.
	—		Occul. *N* Tauri, im. 16h. 21m. em. 17h. 20m.
24			Occul. ε Geminorum, im. 14h. 3m. em. 14h. 50m.
25			Clock after the sun 12m. 55s.
	—		☽ rises 7h. 28m. A.
	—		☽ passes mer. 2h. 20m. M.
	—		☽ sets 10h. 9m. M.
28			Occul. *k* Geminorum, im. 11h. 17m. em. 11h. 22m.
25	12	59	♃ in conj. with the ☽ diff. of dec. 5. 8. N.
	19	25	☿ in inf. conj. with the ☉
26	16	58	♃'s first sat. will im.
	18	36	♃'s second sat. will im.
27	15	0	☿ in Perihelion
	—		Occul. *h*, Leonis, im. 19h. 12m. em. 20h. 10m.
28	11	26	♃'s first sat. will im.
28	19	29	♄ in □ with the ☉
29	4	22	☽ in □ or last quarter
	—		Occul. *d* Leonis, im. 14h. 25m. em. 15h. 17m.
30			Clock after the ☉ 11m. 15s.
	—		☽ rises morn.
	—		☽ passes mer. 6h. 23m. M.
	—		☽ sets 0h. 50m. A.

J. LEWTHWAITE, Rotherhithe.

THE

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CONJOINED SERIES.

No. CXCII.

RECENT PATENTS.

To John Wood, *of Leeds, in the county of York, machine-maker, for certain improvements in machinery for spinning fibrous substances.*—[Sealed 2nd March, 1847.]

These improvements apply to throstle and other spinning machines of a similar kind, in which cotton, flax, and other fibrous substances are twisted or spun into yarns or threads; and consist, firstly, in a peculiar mode of arranging the spindles in such machines, so as to afford the means of employing a greater number in a given length or breadth of machine, and thereby to increase the quantity of work produced; and, secondly, in an apparatus to be connected with each spindle, which, as a fan, is to act against the atmosphere, for the purpose of partially retarding the speed of the bobbins, in order to enable the bobbins to take up or wind on the yarns.

In Plate XIII., fig. 1, represents a partial end view or transverse section of a spinning-frame, in which the improved arrangement of the spindles is exhibited. The first object is to enlarge the working capabilities of a spinning machine, by increasing the number of spindles, in a given length, beyond that of the ordinary machines. This is effected by placing an additional row of spindles in front of the usual row. In order to adapt this additional row of spindles to the machine, so that it may act free of the back row, and also that the yarns, in passing from the front drawing or delivering-rollers, may be brought down to the spindles at but a slight angle of inclination, the front or additional row of spindles is mounted in bracket-arms or ledges, extending from, and descending below, the horizontal longitudinal rails which support the back row or ordinary series of spindles.'

The machine represented at fig. 1, is intended for spinning flax, and therefore has the usual appendages suited for that purpose; the general features of the machine are similar to ordinary throstles or spinning-frames, except in the additional row of spindles and its appendages.

The trough *a*, contains water for moistening the yarns or rovings, which pass through it to the rollers *b*, *b*, and *c*, *c*. From the latter, called the front or delivering-rollers, the yarns or rovings descend through plates or guides *d*, *d*, to the flyers. The ordinary row of spindles, situate at *e*, bear at bottom, in steps, upon the lower rail *f*, and pass through holes in the upper rail *g*. The copping or traverse-rail is seen at *h*, upon which the bobbin *i*, has its bearing; and *k*, is the flyer, fixed on the top of the spindle. The additional row of spindles, represented at *l*, bear, in steps, upon the bracket or rail *m*, extending, in front, from the lower rail *f*; and these spindles *l*, pass through holes in the bracket or rail *n*, extending, in front, from the upper rail *g*, and through the traverse or copping-rail *p*, which supports the bobbins *o*, of the spindles *l*. This bracket-rail *p*, extends from the front of the copping-rail *h*. It will be seen, that the additional row of spindles *l*, are placed lower than the back row *e*, which is designed for the purpose of allowing the yarns to descend from the drawing-rollers to the flyer *q*, at a lesser angle from the perpendicular than they would if the front row of spindles stood at the same height as the back row. From the drum *r*, cords or bands extend to the warves or pulleys of the several spindles *e*, and *l*; and hence, by the rotation of the drum, the spindles are actuated. The bobbins *i*, and *o*, are of the ordinary kind, having a weighted cord pressing against the side of each, by which so much friction is produced as will retard the bobbins sufficiently to cause them to take up or wind on the spun yarns or rovings from the ends of the flyers *k*, and *q*; the copping or traverse-rails *h*, *p*, being raised and depressed, by a heart-wheel, in the ordinary way, for the purpose of laying the yarns uniformly as they are wound on from end to end of the bobbins.

In constructing a spinning machine it is to be observed, that the distance between the two rows of spindles, and also the amount of depression of the front row below the back row, should be more or less, according to the quality or size of yarn intended to be spun, and the number of spindles employed in each row will also be regulated by the same circumstance,—the coarser the yarn the greater the distance. The depression of the front row of spindles will also afford a ready means of access to the back row, for the purpose of piecing or uniting the ends of yarn in the event of their breaking.

The second feature of the invention consists in attaching to the bobbins, or to the spindles, wings or vanes which, as they fly round, shall cause, by the resistance of the atmosphere, a partial retardation in their rotary speed, and thereby enable the bobbins to take up or wind on, the spun yarns, rovings, or threads.

At fig. 2, *a*, *a*, represents a straight spindle, which is fixed firmly in the bottom rail of the machine, and receives a socket *b*, capable of sliding and revolving freely upon it. To the upper part of this socket the flyer *c*, *c*, is affixed, its ends being confined by a ring *d*; and to the lower part of the socket a wharve or pulley *e*, is also affixed, for the purpose of enabling the socket, with its flyer, to be made to revolve by a band from the driving drum of the machine in the ordinary way. Upon the top of the spindle, the apparatus (shewn at fig. 3,) is mounted, and turns freely upon the fixed spindle within the ring of the flyer. This apparatus consists of a hollow tube *f*, closed at the top, its interior fitting loosely on the spindle *a*, so that it may turn with freedom upon the spindle point. The tube has a flange or collar *g*, at its lower end; and to this flange or collar two vertical wings or vanes *h*, *h*, are affixed. The tube *f*, and collar *g*, when mounted on the spindle, support a bobbin; and a small pin *i*, set in the upper face of the collar, is intended to take into a small hole in the upper part of the bobbin, for the purpose of holding it steadily.

Fig. 4, represents the end view or transverse section of a machine for spinning flax, constructed with two rows of spindles, arranged upon the principle described under the first head of the invention; and fig. 5, is a horizontal view of the same, shewing the arrangement of the two rows of spindles, but omitting many parts as unnecessary for the illustration of the second feature of the invention. For the sake of rendering the improvement perfectly evident, the following description of the operations of the machine is given; it being understood that the spindles in this instance are firmly fixed in the bottom longitudinal rail of the spinning frame. Rotary motion being applied by a band to the pulley or rigger *l*, (see fig. 5,) that rotary motion is communicated through the horizontal shaft *m*, by means of bevil gear to the several driving drums *p*, *p*, *p*; from these drums endless bands *q*, *q*, pass round the warves or pullies *e*, *e*, *e*, of the flyers, and round binders or stretcher-pullies *j*, *j*, which keep them at a proper tension. These bands hence give rotary motion to the flyers upon the stationary spindles in the way usually practised. The copping or traverse-rail *r*, *r*, is raised and depressed by a heart-wheel and levers, or by any other suitable means, in the ordinary manner, for the purpose of moving the flyer up and down upon the spindles; the loops, caps, or clamps *s*, *s*, attached to the front of the copping-rail, confine the tubes *b*, of the flyers, but yet allow them to turn freely in their sockets and upon the spindles.

The tubes, with the appendages *f*, *g*, *h*, and *i*, (represented at fig. 3,) having been mounted upon the spindles, as described, the bobbins *t*, *t*, are then placed upon the tubes *f*, bearing upon the flange or collar *g*, below, and held securely in their positions by the pins *i*, as before said. The yarns, rovings, or threads, delivered from the front drawing-rollers *v*, *v*, pass through the guides *u*, *u*, and thence under the rings *d*, of the flyers *c*, to the barrels of the bobbins *t*. Hence, as the flyer revolves, to produce the twisting or spinning of the yarn, the drag of the yarn will pull the bobbin round also, with its tube and collar hanging on the top of the stationary spindle. But the wings or vanes *h*, *h*, at the under part of the collar on which the bobbin rests, being, as they revolve, acted upon by the resistance of the atmosphere, a slight retardation of the rotary speed of the bobbin takes place; and as it is thus made to move slower than the flyers, the yarn will be caused to lap; that is, to be taken up or wound on to the barrel of the bobbin. The uniform winding of the yarn from end to end of the bobbin is produced as usual by the movements of the copping-rail, which gives the sliding ascent and descent to the flyer that guides the lapping of the yarns upon the bobbin barrel. In fig. 5, the situations of the spindles constituting the two rows are shewn;—by the sockets formed in the copping-rail *r*, and the top drawing-rollers being removed in that figure, the several bosses of the lower-roller will be seen to be exactly opposite the centres of the respective spindles; and that, by such arrangement, each top delivering-roller, acting in conjunction with the two bosses, will be made to conduct two yarns instead of one.

In such arrangements of spinning machines as do not employ stationary spindles, but spindles that are made to revolve by a warve or pulley fixed upon each, (as in fig. 1,) the patentee proposes to connect the flyers to the spindles in the manner shewn at figs. 6, 7, and 8. The spindle *a*, (see fig. 6,) has a small stud *w*, set in its side, which is intended to take into a long slot *x*, in the tube of the flyer (see fig. 7.) The tube and its appendages *f*, *g*, and *h*, *h*, (shewn at fig. 8,) is then placed on the top of the spindle, with the bobbin *t*, upon it, as in fig. 8.

The operations of all the parts of this machine will be the same as already described; the pin *w*, in this instance, causes the flyer to revolve with it; and by means of the slot *x*, in the tube of the flyer, the flyer is enabled to rise and fall by the ascent and descent of the traverse or copping-rail *r*; the bobbin *t*, with its tube, as it hangs upon the spindle-point, will be partially retarded in its rotation by the action of the atmosphere against the vanes or fans *h*, *h*, as before described.

A modification in the adaptation of the same principle of retarding the bobbins by vanes or fans, is shewn at fig. 9, in which the vanes or fans *h*, *h*, are affixed to a revolving spindle *a*. In this instance, the flyer *c*, *c*, is driven by a band passed round a warve or pulley *e*, fixed upon the tube *b*, of the flyer; and the bobbin is set fast on the top of the spindle by a pin in the flange on which the bobbin bears. Now, as the flyer is driven round, the spun thread, roving, or yarn, which it conducts, will be made to drag the bobbin *t*, and the spindle *a*, round with it; but the vanes *h*, *h*, being acted upon by the resistance of the atmosphere, will cause the rotation of the spindle and bobbin to be partially retarded; and, consequently, the yarn or thread will be wound upon the barrel of the bobbin.

The patentee claims, Firstly,—placing in spinning machines an additional row of spindles in front of the ordinary row of spindles, and at a different elevation, as described; for the purpose of increasing the productive power of such machines, as compared with those of the ordinary construction. And, Secondly,—the adaptation of vanes or fans, either to the spindles or to the parts which support the bobbins; for the purpose of retarding the rotation of the bobbins by the atmospheric resistance; in order that the bobbins may thereby be made to take up or wind upon their barrels, the yarns or threads descending from the delivering-rollers in the operation of twisting or spinning fibrous materials.—[*Inrolled in the Petty Bag Office, September*, 1847.]

Specification drawn by Messrs. Newton and Son.

To Edward Johnson Coale Atterbury, *of Leeds, in the county of York, merchant, for an invention of certain improvements in gearing machinery,—being a communication.*—[Sealed 10th March, 1847.]

This invention relates to an improved mode of constructing differential gearing, which may be applied to machinery of various descriptions. The ordinary mode of constructing differential gearing, for driving machinery at different speeds, consists in employing either two conical barrels or sets of pulleys of different diameters, when cords or bands are used for transmitting the motion; and, when cords or bands are dispensed with, sets or pairs of toothed or friction-wheels are used, which are put in and out of contact when required. All these plans of constructing differential gearing, for driving machinery at varied speeds, are open to objection, especially when the change of speed is required to be instantaneous, as is the case in many delicate manufacturing operations. The object of the present invention is to obviate these difficulties; and the mode adopted by the inventor to effect this object consists in mounting a series of conical toothed-wheels on a shaft, in such a manner that the whole series, when placed together, may form the frustrum of a cone, having its sides cogged or toothed; and each wheel may be allowed to revolve on or with the shaft, independent of the contiguous ones, when required. These conical wheels are driven by, or are made to drive, another toothed-wheel, mounted on a shaft, which is placed parallel to the toothed surface of the wheels on the other shaft; and the shaft which carries the single driving-wheel is furnished, throughout a portion of its length, with a feather, which passes through the boss of the driving-wheel, so that the latter may be slidden along the shaft when required, and will always revolve therewith.

In Plate XIV., fig. 1, is a side elevation of the gearing, as applied to an ordinary lathe; but it will be obvious to any person conversant with machinery in general, that this improved plan of constructing differential gearing may, with certain modifications, be applied to any machinery where such gearing or occasional changes in the driving speed are required. *a, a, a,* is the driving-shaft, which is actuated in any convenient manner, and is furnished throughout a portion of its length with a feather *b.* A sliding toothed-wheel *c,* is mounted on this shaft *a,* in such a manner that, when it is required to change the speed of the machine, the wheel *c,* may be slidden along the shaft with facility, by means of the forked piece *d,* which is secured to the sliding-rod *e,* and embraces the lower half of a grooved pulley *f*, which is cast on or is attached to the sliding toothed-wheel *c*. The other shaft *g*, on which the cone-wheels 1, 2, 3, 4, 5, and 6, are mounted, is properly the main-shaft of the machine to be actuated; but it will be evident, that it may be made to act as the driving-shaft, and the shaft *a*, as the main-shaft of the machine to be actuated. The cone-wheel 1, is fixed upon the shaft *g*, and therefore always revolves with it; but the other five are mounted on the shaft, in such a manner that each may revolve independently of the others. The shaft *g*, is fluted, as shewn in the detached sectional view, fig. 2, at that part where the cone-wheels are mounted; and each of the wheels 2, 3, 4, 5, and 6, are furnished with palls or clicks *h*, (as represented in the cross section, fig. 3,) which take into the teeth or flutes of the shaft *g*, and therefore cause the wheels to be carried round by the latter in one direction, but allow of the wheels either stopping or revolving in the opposite direction, when not in gear with the driving-wheel of the shaft *a*. Now, supposing that this shaft *a*, and its toothed-wheel *c*, is driven at a regular and uniform speed, by means of a band passing over a pulley *i*, (see fig. 3,) or in any other convenient manner, it will be easily understood that the speed of the shaft *g*, may be varied, by merely moving the wheel *c*, along the shaft *a*, by means of the sliding-rod *e*, and fork *d*. In moving the wheel *c*, along its shaft, in order to change the speed of the machine, the wheel *c*, will, during its passage, be for a moment in gear with two of the conical wheels 2, and 3, of the shaft *g*; and as these two wheels 2, and 3, are of different diameters, and have a different number of teeth, it will be evident that they cannot revolve at equal speed, although mounted on the same shaft; and that if they were both rigidly fixed on the shaft, the teeth of one of the wheels must give way when it was attempted to drive both at the same speed with one driving-wheel *c*. To obviate this difficulty, the wheels 2, 3, 4, 5, and 6, by being connected to their shaft by means of palls or clicks, as already described, are allowed to move in a retrograde direction when required; so that when the pall or click of one wheel, 2, is engaged in the indentations or ratchets of the shaft *g*, and thereby drives the latter round, the adjoining wheel 3, (if at the same time in gear with the driving-wheel *c*,) makes a gradual motion round the shaft *g*, while being carried round; so that the speed of the peripheries of the two wheels 2, and 3, (one being fixed and the other loose on the shaft) may be in due proportion; the wheel of the smaller diameter making a greater number of revolutions, within a given time, than the larger one, so as to make up for the difference in the diameter or circumference of the two wheels. If the driving-wheel *c*, is slidded farther along the shaft *a*, the same thing takes place; for while two other wheels are in gear with the driving-wheel *c*, the smaller of the two will be made to gradually revolve round the shaft at the same time that it is revolving with it. This effect will be continued but for a few seconds, viz., while the change from one wheel to another is taking place; but if, by accident, the driving-wheel *c*, should remain in gear with two of the cone-wheels for any length of time, no derangement of the machinery can take place; as the smaller cone-wheel will always accommodate itself in speed to the other, which could not be the case if both wheels were rigidly fixed on the shaft.

The arrangement of gearing machinery, above described, and shewn at figs. 1, 2, and 3, will be found particularly applicable for all purposes connected with cotton and other manufactures, where instantaneous variations in speed are occasionally required, and where it is not requisite that the gearing should be made to revolve in both directions; but when the improved gearing is to be applied to purposes where the shaft will be required to revolve in either direction, as will be the case when applied to a propeller for propelling vessels, then some arrangements must be made whereby a reverse motion may be obtained. This may be effected by introducing a bar or rod in a groove made in the shaft *g*, and causing the bar to move laterally, and catch against each of the cone-wheels by means of stop-pieces, and thereby hold the said wheels fast, and prevent them from turning on the shaft when the latter is made to revolve in the opposite direction. Fig. 4, is a longitudinal section of the means for locking the cone-wheels to the shaft *g*, when required; and fig. 5, is a cross section of the same. A deep groove is cut along the shaft, for the purpose of receiving a rod or bar *i*, *i*, which is provided with a number of stop-pieces, corresponding to the number of the loose cone-wheels. These stop-pieces project from the shaft; and as the rod or bar *i*, may be slidden laterally along the groove, the stop-pieces may be brought in front of the banking-pieces at the end or tail of the pawles or clicks *h*, *h*, and will therefore prevent them from moving round, except in conjunction with the shaft. One end of the rod or bar *i*, is made to project through the hub of the first or last cone-wheel, and may be moved laterally by hand in any convenient manner. Supposing this apparatus to be adapted to the propeller-shaft of a steam vessel, the cone-wheels may be driven round in one direction, for going forward; but when the motion of the propeller is to be reversed, to back the vessel, the rod *i*, must be first slidden laterally, in order to bring the stop-pieces against the banking-pieces at the tail of the pawles *h*; the shaft *g*, may then be made to revolve in either direction, and carry round the cone-wheels, which then become locked to it; but when it is required to alter the speed of the propeller-shaft, the cone-wheels must all be unlocked or disconnected from the shaft *g*. In order to do this, the rod or bar *i*, is drawn back, so as to release the cone-wheels, and leave them free, as before, to revolve round the shaft *g*, in one direction; and when the change of speed has been effected, the cone-wheels may, if required, be again locked, so that the shaft *g*, may at all times be ready to revolve in either direction.

The patentee states, that he does not intend to claim the exclusive right of mounting a series of toothed-rings or wheels, of various diameters on the same shaft, which may be driven at different speeds, by causing a pinion or wheel on the driving-shaft to gear into the teeth of the said rings or wheels on the first-mentioned shaft; but he claims, First,—a gearing apparatus applicable to any and all purposes where differential or varying speeds are required; by which the speed of the machine to which it is applied may be instantaneously changed, without stopping the machine or shaft to make the required alteration,—such apparatus consisting of a series of bevilled-tooth-wheels, of different diameters and number of teeth, mounted on one shaft, in such a manner as to form a toothed cone; each wheel of which may be made to rotate independently of the other, and drive, or be driven, by the shaft on which it is mounted. Secondly,—the means, above shewn, of applying the herein-described apparatus to the purposes of propelling vessels.—[*Inrolled in the Petty Bag Office, September*, 1847.]

Specification drawn by Messrs. Newton and Son.

To Joseph Storer, *of Stanhope-street, Mornington-crescent, in the county of Middlesex, musical instrument maker, for improvements in organs, seraphines, and other "free-reed" instruments; part of which improvements are applicable to piano-fortes,—being partly a communication.*—[Sealed 27th June, 1846.]

This invention consists, firstly, in a new arrangement of apparatus, constituting an improved "free-reed" instrument, whereby various qualities of tones may be produced, at the same or at different times, by the depression of one key. In order to effect this, and obtain what the patentee terms—an organ variety of tones, instead of providing one tongue or vibrator for each note of the gamut, six vibrators are placed abreast of each other (more or less, but this number is preferred) of different qualities and pitches of tone; and to each of the tongues a stop is applied, for the purpose of shutting off the whole series of a particular quality or pitch, when required. By this means, the keys, on being depressed, may be made to bring out the full body of tone which the instrument is capable of giving,—or, for piano passages, to produce a soft and subdued tone, agreeably to the will of the performer.

The construction of this instrument will be seen, on referring to Plate XIV. Fig. 1, is a vertical section, taken through the middle of the instrument; fig. 2, is a partial elevation of the back of the same,—a portion of the wind chest being broken away to shew the interior construction more distinctly; and fig. 3, is a partial front view of the instrument, shewing the stops for shutting off the several qualities and pitches of notes as required. *a*, *a*, *a*, is the framing for supporting the various parts of the instrument; *b*, *b*, is the wind-chest; and *c*, *c*, are the bellows, which communicate with the wind-chest by a pipe *d*, and are actuated by a pedal in the ordinary way. *e*, is a central partition or sound-board, placed parallel to the back and front of the wind-chest, and intended to divide it into two compartments. Between the back and central partitions there are small partitions, which cross each other at nearly right angles, and divide the space between the partitions *e*, and the back of the chest, into small air-tight chambers *f*; one chamber being assigned for every note the instrument is intended to produce. By referring to fig. 2, it will be seen that these chambers *f*, are arranged in rows, one above the other; but, instead of being set vertically over each other, the chambers are placed a little aslant, in order to allow of a series of rods *g*, *g*, *g*, standing up vertically, as represented. These rods *g*, are each connected at their upper ends with a valve *h*, attached each to its several air chambers; and the lower ends of these rods rest upon the inner end of the playing keys *i*, (see fig. 1.) In the back-board of the wind-chest a series of circular holes are made, one for each of the divisions or chambers *f*; and it is for the purpose of covering these holes, that the valves *h*, which open inwards, are employed, as is well understood:—they are kept up to their seats by an India-rubber or other suitable spring.

The central partition or sound-board *e*, is provided with six slots or openings for each chamber *f*, (see fig. 2,); and over each of these slots a metal pallet *k*, is fixed, for the purpose of preventing the air, at certain times, from passing through the slots, and escaping from the chest when the valve *h*, is opened. Towards the front of the air-chest, the upper edge of these slots is chamfered outwards, in order to give them a greater length, and allow of a free passage of air through them. Over each of the slots or openings in the partition *e*, a vibrator *l*, is placed, of such a proportionate size and weight, as to give out the quality of tone desired when the tongue is put into vibration. It has been stated, that one or all the tongues of each respective chamber *f*, may be made to utter a sound on the depression, by the finger, of the key which bears relation to such chamber. The following description will explain how this is effected:—*m*, *m*, are a series of rods, arranged in sets of six, to suit the number of qualities and pitches of tone produced by the instrument, and placed in the space between the front board of the wind-chest and the central partition or sound-board *e*. These rods take the slant, from a vertical line, of the chambers, as before explained; and they are each connected to six metal pallets *k*, by pins, which pass through the sound-board *e*, for that purpose, as shewn at fig. 1. *n*, *n*, are six horizontal bars, placed one above the other in front of the wind-chest; and to each of these bars one of every set of the series of rods *m*, is securely attached, by pins passing through the front of the wind-chest. These bars are connected each to a bell-crank lever *o*, *o*; and the shorter arm of these six levers receives through it a pin projecting from the upper end of a vertical rod *p*, which is provided at its lower end with an antifriction-roller, and rests upon a "stop" *q*. In the upper edge of this stop, a recess, with an inclined face, is cut, to receive the end of the rod *p*. The object of the recess is, that when the stop is drawn out, the incline, coming in contact with the roller, will raise the rod *p*, and, consequently, cause the longer arm of the crank-lever *o*, to press in the bar *n*, which will force forwards the rods *m*, connected therewith; and by reason of the pins, which connect these rods with the pallets *k*, will push them inwards, and leave open the slots which they formerly covered. Thus, it will be seen, that if the rod p^1, is raised, the bell-crank lever o^1, will act upon the bar n^1, which will cause the several rods m^1, m^1, to move inwards, and open all the slots, which are connected with the series of vibrators that produce one quality of tone throughout the instrument. If another quality of tone is required, another stop may be drawn out, and a similar effect will be produced on, say, the next adjoining set of rods *m*, and pallets *k*; and so on through the six sets, as the performer may desire.

The construction and arrangement of the instrument being understood, the action to produce the notes required for a musical performance may be thus briefly described:—The wind-chest *b*, being provided with air from the bellows *c*, and the pallets *k*, being pressed in by the bars *m*, the key, when struck, supposing it to be C, will open the valve *h*, in connection with that chamber which is provided with the vibrators to produce the note C;—the air in the chest will immediately press upon the tongues of the vibrators which are over the open slots in the chamber, force the tongues inwards, and, rushing into the chamber, will make its exit at the open valve.

The second head of this invention consists in a certain novel application of parts to free-reed instruments, whereby a small but distinct sound may be obtained, without the employment of wind; and when wind is used, a more perfect enunciation of the notes than has heretofore been produced in such class of instruments will result, and greater expression may be given to the performance; as the touch of the instrument resembles that of the piano-forte. Fig. 4, is a vertical cross section of a free-reed instrument, with the improvements applied thereto; and fig. 5, is a longitudinal section of the same, taken in the line 1, 2, of fig. 4. *a*, *a*, *a*, are three wind-chests, one behind the other on the same plane, and furnished in the ordinary manner with vibrators and valves; *b*, *b*, are the bellows; and *c*, c^{*}, the keys of the instrument. In the drawing, the improvement is shewn as applied to one wind-chest only, but it is obvious they may all be similarly provided, if required. The action of this instrument being well understood, it is only necessary to describe the hammer-action for striking the metal vibrators. *d*, fig. 4, represents one of the hammers covered with leather, vulcanized India-rubber, or other suitable substance. This hammer turns on a fulcrum-pin, supported by the bracket *e*; and it is retained in a horizontal position by a peculiarly-formed plunger *f*, which abuts against a projection on its fulcrum end. This plunger is composed of two pieces of wood, hinged together by leather (as shewn), and its lower portion is still further secured to the upper by a thread or spring of vulcanised India-rubber, the ends of which are passed through two eyes, one on each side of the upper part, and tied to similar eyes on the sides of the lower part. The loop of rubber, thus formed, is hooked into a staple, provided on the under face of the sound-board for that purpose. Into the upper part of the plunger *f*, a vertical pin *g*, is inserted, of such a length as to reach the under part of the lever of the valve *h*, of the sound-board; and above the lever, and in a vertical line with the pin *g*, is a pin *i*, projecting from the under face of the key *c*.—*k*, *k*, is a wooden frame, supported at its inner ends by pins, on which it rocks. This frame is placed under the keys *c*; and, when any one of the keys is depressed with sufficient force, the frame *k*, will be pressed down, and being connected by a pendant-rod *l*, with the lever of the valve *m*, which closes the communication between the bellows and the air-chest, this movement of the frame will raise the valve *m*, from its seat, and admit a fresh supply of wind to the air-chest *a*. If a key *c*, is but lightly touched (as will be the case when the performer wishes to avail himself of the peculiarity of this instrument, viz., to produce a small tone without using the wind), that key which is struck will, by the pin *i*, depress the lever of the valve *h*, and, in doing so, force down the pin *g*, and plunger *f*; by which motion, the hammer *d*, will be made to rise and strike the vibrator *n*, immediately above it. By this mode of using the instrument, tones, somewhat similar in quality and power to those obtained from a guitar, will be produced, and thus the correctness of the performance may be ascertained, without inconvenience to persons in an adjacent room. When, however, the full tone of the instrument is required, the depressing of the keys, with the usual force, will cause both the wind and the hammer to act on the vibrator, and thus a more brilliant quality of sound will be obtained than from instruments of the ordinary construction.

In this, as well as in the before-described instrument, the patentee has found it advisable, for bass notes, to fill the shell of the vibrator flush to its edges, with lead or other metal, or asphalte, wax, or other hard substance; and form, as it were, a wall round the vibrating tongue, as shewn in the detached views at figs. 6. Another improvement on the vibrators is, to attach the tongue to the frame, by casting clamps on the front of the frame, and slipping the end of the tongue therein, as shewn at figs. 7; instead of screwing or rivetting the tongue, as shewn at figs. 8; which latter mode, although generally employed, is more tedious and expensive.

The third head of this invention refers to improvements in barrel-organs, and other wind instruments in which barrels or rollers are employed to produce tunes by mechanical agency; and consists, firstly, in an arrangement of machinery, whereby a barrel or roller, of much smaller dimensions than those at present used in producing tunes, may be employed. By this arrangement, barrels studded or pinned for a single tune, can be supplied at a considerably reduced price; and the tune may be readily transposed to any key as required; and may be used in connection with a finger-organ, seraphine, or other similar keyed instrument.

Fig. 9, represents a front view, partly in section, of the improved apparatus applied to a keyed instrument, say, an organ; and fig. 10, is a cross section of the same. When the barrel or roller is applied to organs, or other similarly-constructed instruments, which are not provided with finger-keys, the apparatus is made to act upon the "backfalls," "levers," or "rollers," instead of upon the keys, as will be now described. This latter adaptation the patentee has shewn as being more simple; but the application of the improved apparatus to barrel-organs will be readily understood, and may be carried out by any competent workman. *a*, *a**, are the keys of the instrument; and upon their face a series of vertical rods, *b*, *b*, rise. These rods are supported in a frame *c*, and are placed at equal distances apart; their lengths vary in order to suit the white and black notes, and allow their upper ends to be on a level with each other. Immediately above the rods *b*, are a series of vertical rods *d*, the lower ends of which pass through holes made in the bottom of the frame *e*, *e*, and work freely therein, when acted upon by the machinery to be now explained. *e*, *e*, is a frame, resting upon the frame *c*, and secured thereto by steady pins, in the same way as that frame is attached to the instrument; *f*, *f*, are bearings, attached to the frame *e*, and intended to carry the pinned-barrel or roller *g*, shewn detached at fig. 11. One end of the axle of this roller is filed off to a tongue-form, in order to drop into a cut, or fork, formed in the end of a short shaft, in a line therewith. This shaft is provided with a worm-wheel h, which takes into a worm i, keyed on to a shaft k, furnished with a winch-handle. On the periphery of the roller g, suitable projections are formed, according to the tune required, as in the ordinary organ cylinders; and immediately above this roller a series of levers l, l, are suspended, their number being regulated according to the range or compass of notes in the tunes or pieces which are intended to be performed on the instrument. These levers work upon a horizontal rod m, and are kept at equal distances apart by a kind of comb-bar; they are furnished with a tooth on their front ends; and as the roller revolves, are forced upwards by the projecting studs, on the roller coming in contact with the teeth. The inner ends of these levers rest respectively upon a vertical rod n, which rods are each connected to an arm o, at one end of a rocking-shaft p, mounted in bearings on the back of the frame e; q, is another arm, also forming a part of the rocking-shaft p. These arms q, are respectively attached to pins standing up from the vertical rods d. It will now be seen, that when rotary motion is given through the agency of the winch, worm, and worm-wheel, to the barrel or roller g, a stud on that roller, coming under the tooth of the lever l^*, (fig. 9,) will cause that lever to depress the rod n^*. This motion will communicate a rocking movement to the shaft p^*, which will depress the rod d^*; and thereby, through the rod b^*, a downward pressure will be given to the black note beneath that rod; r, r, are a series of screws for adjusting the levers l, at their right height for meeting the studs on the roller g. This roller or barrel is mounted, in the manner above stated, for the convenience of being taken out of the instrument, and replaced by another, which contains studs for a different tune, and also to avoid the necessity of having a worm-wheel for every barrel. On the outer end of the worm-wheel shaft is a screw, into the thread of which a fixed pin s, takes, in order that, as the wheel revolves, it may be shifted laterally, to allow of a fresh set of studs on the barrel g, coming under the teeth of the levers l, at a second rotation of the barrel. A spring is provided for pressing the barrel forward, so that it may follow the motion of the worm-wheel shaft. When the tune is required to be repeated, the pin *s*, is withdrawn, and the barrel is returned to its original starting position. The mode of transposing tunes from one key to another is very simple, as it is only necessary to lift off the frame *e*, *e*, with its apparatus, and place it further to the right or left on the frame *c*, as may be required.

A modification of this part of the invention consists in employing a flat board instead of a short roller or barrel. The arrangement of the apparatus for depressing the finger-keys, or the backfalls, levers, or rollers, is very similar to that above described. Fig. 12, is a vertical section of the apparatus applied to a finger-organ. *a*, *a*, *a*, is the board, provided with studs, in a manner similar to the barrel; and this board is placed in a frame *b*, *b*, the sides of which are cut away, to form grooves for the board to slide up and down in freely. At the back of the board is a metal plate *c*, which has a foot at bottom to carry the board; and attached to the lower end of this plate *c*, is a cord *d*, which passes up behind it, and is wound on to a roller *e*, supported by brackets on the frame *b*. On the shaft of this roller is a worm-wheel *f*, which takes into a worm *g*, on a short shaft, provided with a winch-handle. When, therefore, the handle is turned, the roller *e*, will wind up the cord *d*, and draw up the board, the studs of which projecting, will come in contact with the teeth on the upper ends of a series of vertical levers *h*. The manner in which this motion is communicated to the keys of the instrument is thus explained:—In the first place, it is necessary (in order to admit of the tune being transposed when required) to level all the keys; and in this modification of the apparatus, a somewhat different mode to that before described, of bringing the black and white keys to a uniform height, is shewn. To the "name-board" *i*, of the instrument a bar *k*, is attached, by screws or otherwise; and to this bar a series of levers *l*, *l*, are hinged, one for every white key. The height of these levers is just sufficient to bring them on a level with the black keys, when they are placed over the white; and this being effected, the apparatus for depressing the keys may be attached to the instrument by pins *m*, taking into holes provided for the purpose. In the projecting part *b**, of the frame *b*, a series of holes are made, to allow a given number of vertical rods *n*, *n*, (which number is regulated according to the compass of the tunes required to be played) to slide up and down therein freely. These rods are set at equal distances apart, to correspond to the keys beneath; and at the top of the rods are pins, which enter the ends of a series of horizontal bars *o*, *o*, attached to rocking-shafts *p*, *p*. These shafts are placed in parallel lines, diverging one-half to the right and the other to the left; and they are severally supported by brackets from the frame *b*. On their inner ends they carry the series of levers *h*, *h*, before mentioned. It will now be seen, that as the studs in the board *a*, force forward the levers *h*, the shafts of such levers as are moved will be rocked; and these shafts being connected to bars *o*, their respective bars will be depressed; and thus push down their respective vertical rods *n*, on to the keys beneath them. When the board *a*, has passed the ends of the levers *h*, the tune will be finished. It may then be lowered, by throwing the worm *g*, out of gear with the wheel *f*, to repeat the tune, or another board may be placed in its stead.

The fourth head of this invention consists of an arrangement of apparatus to be attached to finger-organs, finger-seraphines, and other similarly-keyed instruments, for the purpose of enabling indifferent players to perform psalmody or other slow music with full chords, by depressing, with the direct action of the finger, those keys only which answer to the notes constituting the air or melody. Fig. 13, is a vertical section, taken through the middle of the apparatus, and fig. 14, is a vertical cross section, taken in the line 1, 2, of fig. 13. *a*, *a**, are a series of strikers, placed in a row, at equal distances apart, over the notes, and regulated, as to length, so as to suit the black and white keys, and allow their upper ends to be at an even height. These strikers *a*, *a**, slide freely in holes made in the plates *b*, and *c*, which are attached together by a framing, and fixed over the keys or the organ or other instrument. Upon this framing a case or box *d*, *d*, *d*, is placed, and firmly secured thereto by pins or otherwise; and within the box, and at either side thereof, several rocking-shafts *e*, *e*, *e*, arranged parallel to each other, are mounted. These shafts are provided, on their periphery, with certain pins or studs, which take into slots formed in vertical bars *f*, *f*, *f*, or otherwise act upon these bars, some of which are bent out of a right line to bring their ends over their relative keys. Some of these bars are provided with a step or ledge, through which a pin, from the vertical stops or pistons *g*, *g*, *g*, projects. These pistons slide in holes made in the top of the box for that purpose, and are prevented from turning round by a pin standing out from their periphery, and taking into guides attached to the cover of the box for that purpose. *h*, *h*, *h*, are coiled springs, connecting the bars *f*, with a longitudinal fixed bar *i*:—whenever, therefore, the pistons are depressed by the player, they will have a tendency to rise immediately they are released from pressure.

The object of attaching this apparatus to organs and other similarly-keyed instruments being, as before said, to produce chords or full harmonies by the depression of a single stop or piston for each chord, the patentee explains, by diagram, how the apparatus is arranged to effect this result. Two rows of pistons *g*, *g*, are provided, one row answering to the major and the other to the minor keys; these rows are each divided into two series. In order to construct this apparatus to produce the most perfect harmony, it will be necessary to choose the most agreeable chords for each note of the several keys; and these the patentee has given in diagram, shewing the chords which he intends the apparatus to produce, on the depression of the several stops. It will be understood, that if the piston or stop, answering to C, is depressed, and it is desired to obtain its chord, (as written in the bass clef, No. 2 series of the diagram) the bars *f*, which stand immediately over the keys G, E, C, below, must be so connected with the bar *f*, which belongs to the C-stop, as to strike their relative keys when the C-stop is depressed. This is effected by one of the rocking-shafts *e*, being provided with pins or studs, which take into slots in the bars *f*, that stand over those notes. When, therefore, the C-stop is depressed, as shewn at fig. 13, a shoulder on its bar *f*, will come in contact with a pin, projecting from the shaft e^1, and cause it to rock and carry down these bars *f*, to strike the keys G, E, C, as required. Thus, at the moment that the depressed piston strikes its own note on the instrument (which note always belongs to the treble), its relative chord will also be sounded. The shafts *e*, are returned to their original position (after being rocked) by means of the coiled springs *k*, *k*. If a particular note is required to be used in forming a chord to more than one note, it may be provided with two or more slots or shoulders for pins or studs on other of the rocking-rollers *e*, to take into or act against. That side of the instrument containing the pistons for the minor keys is constructed in a precisely similar manner to that shewn at fig. 13; the only difference being the disposition or arrangement of the depressing-pins on the rocking-shafts, to bring down those bars *f*, which answer to the notes composing the several chords.

The fifth part of the invention refers to a novel construction of transposing key-board to be applied to piano-fortes and to other instruments which are similarly furnished with keys. Fig. 15, shews an elevation of the apparatus applied to a piano-forte; and fig. 16, is a cross section of the same: upon the white keys of the instrument a number of filling-pieces *a*, *a*, are laid, as described with reference to fig. 12.—These pieces are hinged to a longitudinal bar *b*, attached to the name-board or other adjacent part; and to the upper part of this bar a metal rib is attached, on which a bar *c*, is fits, in any convenient manner. To this bar *c*, any given number of black and white keys *d*, arranged in their usual order, are hinged; and each key being furnished on its under face with a pin *e*, they are all supported at a uniform level; the pins resting upon the black keys below, or upon the filling-pieces *a*. When, therefore, a piece of music is required to be played in a different key to that in which it is written, the upper or additional key-board must be fixed on the instrument, so that its keys will not correspond in position with those below. That is to say,—if the music is to be transposed half a note higher, the black key *d*, furthest to the right, will be placed so that the pin *e*, of that key will stand over the filling-piece *a**, in which position, when the keys are struck, sounds half a note higher will be produced by all the keys, than if they corresponded in position with the keys below. To transpose into a lower key, the upper board is moved to the left; and thus, as will be readily seen, a piece of music may be performed in any key.

The last part of the invention consists in applying to the keys of piano-fortes, organs, seraphines, and other similarly-keyed instruments, a covering, of various substances, of a hard nature, and which are susceptible of receiving a high polish, and of being made of suitable colors. The principal substances to be applied to this purpose are either glass or vitrified matters, rendered opaque or semi-opaque, and colored, by the admixture of such ingredients, during the process of manufacturing the glass, as will produce the opaque or semi-opaque appearance of enamel. The ingredients suitable for this purpose and the proportions in which they should be added to the vitrifiable matters, so as to produce the required compound, are well known to glass manufacturers, and therefore need not be enumerated here. These glass or vitrified coverings for the keys are attached to the wooden part of the keys in the ordinary manner, or they may be cemented to the wood by means of any suitable cement; the under side of the covering being purposely roughened, in order to make the covering adhere to the wood.

Instead of glass, the patentee proposes to employ enamelled coverings, made by the same process as clock and watch-faces. He further employs coverings made of porcelain, china, and earthenware, of the proper form and color; and when price is an object, these coverings will be found to answer the purpose very well, as they are not liable to stain like bone or ivory; but when a superior article, made of the above mentioned or other analogous material, is required, the porcelain clay is submitted to very heavy pressure. The coverings thus produced may be attached to the wood in the ordinary manner, or by means of cement, as described in reference to the glass covering.

The patentee claims, as respects the first head of the invention, Firstly,—the improved arrangement of instrument whereby a variety of pitches and qualities of any note, which the instrument is capable of producing, may be obtained by the depression of one key; and, when required, one or more of such pitches and qualities may be shut off in every chamber containing the vibrators. Secondly,—the application of a general valve (one being provided for every key) in conjunction with each series of pallets connected with a finger-key; which pallets will stop the exit of the wind from the wind-chest, either before or after it has acted upon the vibrators.

With respect to the second head of his invention, the patentee remarks, that he is aware it has been proposed to give a mechanical impulse to the vibrators of concertinas, in a manner similar to that adopted in harpsichords; he does not, therefore, intend to claim the principle of a combined action of wind and mechanism, on the tongues of vibrators, to cause the enunciation of notes; but he claims, Firstly,—the application to free-reed instruments of a hammer-action, to be worked by the finger-keys, whereby, without the use of wind, tones are obtained from the vibrators, of a quality somewhat resembling that of a guitar; and, by the additional employment of wind, notes of a richer quality than heretofore are produced; the touch of the keys is also more nearly assimilated to a piano-forte touch. Secondly,—the application of the vibrating-frame, placed beneath the keys, and connected with the wind-entrance valve, whereby, in conjunction with the striking apparatus, a more perfect modulation of the tones of the instrument is effected than has before been produced. Thirdly,—with respect to improvements in seraphines, and other free-reed instruments, he claims the novel mode of constructing vibrators, as above explained.

Under the third division of the invention, which consists in improvements in organs, seraphines, and other free-reed instruments, he claims the application thereto of the improved apparatus, with short barrel or roller, whereby the backfalls, levers, or rollers of barrel-organs, and the pallets of barrel-seraphines, or other free-reed instruments, may be actuated to produce any required tune, by merely substituting one small barrel for another. He also claims applying and attaching this apparatus to organs and other similarly-keyed instruments, as above explained. Secondly,—the modified arrangement, shewn at fig. 12, in which a flat board is employed instead of a roller or barrel. Thirdly,—the two several modes of levelling the keys of organs and other similarly-keyed instruments; in order to admit of the apparatus, for actuating the keys, being placed over any part of the key-board, whereby the tune may be readily transposed.

Under the fourth head of the invention he claims the improved construction of instrument, whereby, on depressing certain stops or pistons which answer to the notes composing the air or melody of a tune, the chords or harmonies of such notes will be simultaneously produced, as above stated.

Under the fifth head of the invention, he claims the application of an additional key-board to piano-fortes and other similarly-keyed instruments, whereby the performer is enabled to transpose pieces of music by merely shifting the upper key-board; and when not required to be used, that key-board may be removed. Lastly,—with respect to organs, piano-fortes, seraphines, and other similar free-reed instruments, he claims the adaptation, employment, or application of the substances, before mentioned, for facing the playing-keys of such instruments.—[*Inrolled in the Petty Bag Office, December*, 1846.]

Specification drawn by Messrs. Newton and Son.

To Alexander Debain, *of Paris, in the kingdom of France, manufacturer, for certain improvements applicable to keyed musical instruments.*—[Sealed 29th August, 1846.]

This invention consists, firstly, in the application to piano-fortes and similar keyed musical instruments, of apparatus suitably arranged for acting on the keys of the same, so as to enable a person unacquainted with music to produce varied musical sounds, according to a written composition, by simply moving a lever or handle; and, secondly, in the application of wind-reed instruments to piano-fortes and similar keyed musical instruments: this part of the invention may be used alone or combined with the first part.

In Plate XV., fig. 1, is a plan view, fig. 2, an end view, partly in section, and fig. 3, a front view of the apparatus, arranged according to the first part of this invention, and termed by the patentee the "antiphonel." It consists of a frame, on the top of which there is a metal plate *a*, having a series of openings formed in it, extending in a row from the front edge of the plate to the back; through these openings the teeth or pointed ends of the levers *b*, project, so that they are above the surface of the plate *a*, and can therefore be acted upon by the pins or projections of the block *c*, in the manner hereafter described. The levers *b*, are connected by links *d*, with the levers *e*, which act through the medium of the rods *f*, (which pass through holes in the bar *g*,) upon the keys *h*, of the piano-forte or other instrument; so that when the tooth of any lever *b*, is pressed downwards, the corresponding key will at the same time be pressed down, and the desired sound will be thus produced.

In front of the frame there is a lever *i*, which, on being moved up and down, causes the ratchet-wheel *j*, to rotate, by its clicks or detents *k*, acting on the teeth of the same; and upon the same spindle as the ratchet-wheel *j*, a cog-wheel *l*, is fixed. This wheel gears into a rack formed on the under edge of the plate *m*, affixed to the block *c*; and thus, by each movement of the lever, up or down, the block *c*, is caused to advance a short distance along the surface of the plate *a*; the block being guided by the plate *m*, working in the groove *n*. The under side of the block is furnished with a number of small iron pins or projections, (as exhibited in the perspective view fig. 4,) which, as the block moves along the plate *a*, press upon the ends of the levers *b*, and thereby cause the rods *f*, to press upon the keys of the piano-forte or other instrument. The notation of the block *c*, is similar to that of the cylinder of a common organ, except that the latter consists of a cylindrical surface, which, when it has made one revolution, goes on to repeat the same; whereas, the blocks *c*, may be multiplied to any extent, (the pins being set differently in each,) and may be caused to follow each other so as to produce constantly varying effects." *o*, is a hand, which points out the notes upon the upper surface of the block *c*, as it moves along: "these signs of music indicate the rhythm of the piece." *p*, is a small roller, which presses upon the block *c*; the pressure being regulated by means of the nut *q*. *r*, *r*, are stops, to limit the motions of the lever *i*. The back part of the antiphonel rests upon the bar *s*; while the front part is supported by the arms *t*, *t*, affixed thereto, and having openings in their outer ends, in order that they may rest upon and slide along the rod *u*.

In using this apparatus, the operator places a block *c*, (having the pins suitably arranged for producing the required notes,) upon the plate *a*, and then moves the lever *i*, up and down, according to the rhythm of the piece; which, on commencing to use the apparatus, ought to be played over several times, in order that the operator may be well acquainted with the movement of the lever. After the "rhythmique movement" of a piece has been well studied, it can be executed with as much precision as if it were performed by a first-rate player; and the same piece may be transposed instantaneously into any other key, by moving the antiphonel along until its peg *v*, enters that hole in the bar *s*, which is marked with the corresponding note.

The patentee says, that he does not confine himself to the above mode of giving motion to the blocks *c*, as they may be caused to travel onward by means of a screw; in which case the movement of the blocks would be continuous, and the time for each note would be regulated by the distance between the pins upon the block. He does not confine himself to the use of pins projecting from the block, as the same effect may be produced by perforations in the block; but then the arrangement of levers for acting on the keys must be altered accordingly. Or the mechanism may be arranged in such a manner as to dispense with the block or board *c*, by forming a series of thirty or forty accords, majors or minors, which would correspond with so many numbers, buttons, or knobs; and then the numbers of the knobs belonging to the notes that are to be played, having been marked upon paper, a finger of the performer is to be placed successively upon the different knobs: by this means certain effects will be produced, sufficient for accompanying the chants of a church.

The second part of this invention is shewn in the sectional view, fig. 5, which exhibits part of a piano-forte, with an instrument applied thereto called a "clavi-harmonium." It is composed of a small key-frame, two sets of bellows, and a series of vibrating spring-reeds, similar to a seraphine; and is to be applied to the front of a piano-forte, or similar musical instrument: thus, two sets of keys will be presented to the performer, either set of which may be played upon singly, or the two sets may be played upon at the same time.

a, *b*, are the keys of the clavi-harmonium, which are mounted on pivots, carried by projecting pieces *c*, from the key-frame *d*; from each key a thin metal arm descends, and transmits the movement of the key through a hopper, or spring-lever, to a valve that closes an opening in the reed-chamber *e*. *f*, is a slide, pierced with holes, corresponding with other holes in the case of the instrument; by moving which slide, more or less sound is allowed to escape through the holes. The supply of air for acting on the spring-reeds *g*, is furnished by two bellows *h*, one at each side of the performer, and they are kept filled with air by two other bellows, worked by the performer moving his legs sideways. The clavi-harmonium is attached to the front of the piano-forte, or other like instrument, by means of two projecting pieces or staples, one at each side of it, which enter suitable sockets, fixed to the under side of the key-frame of the piano-forte, and are retained therein by set screws; but other means of attachment may be used; or the instrument may be applied to the front of the piano-forte, without being fastened thereto; or it may be used alone.

The patentee claims, Firstly,—the arranging mechanical apparatus, as above described, capable of being acted upon by moveable surfaces, having suitable projections or indents, as before described; also the arranging surfaces *c*, capable of acting on suitable apparatus, to give motion to the keys of piano-fortes, or such like keyed musical instruments, as above described. Secondly,—the arranging apparatus, having spring-tongues or reeds, as above described, whereby the same may be readily applied to and detached from piano-fortes, or other similar keyed musical instruments.—[*Inrolled in the Inrolment Office, February,* 1847.]

To Benjamin Tucker Stratton, *of Bristol, agricultural machinist, for improvements in railways, and in wheels and other parts of carriages for railways and common roads,—partly applicable in the construction of ships or other vessels; and improvements in the machinery for manufacturing certain parts of the same.*—[Sealed 6th April, 1847.]

The first part of this invention relates to that description of rail for railways which consists of a hollow ridge, of any suitable section, with a horizontal flange on each side, having suitable holes formed in it for the reception of the bolts or spikes used for attaching the rail to a longitudinal sleeper.

In Plate XIII., fig. 1, is a transverse section of a rail of this kind, which has been extensively used on railways. These rails, when subjected to heavy loads, frequently become crippled, by spreading or contracting at the base; and to prevent this is the object of the present improvement,—which consists in attaching to the under side of the flanges a bar or plate of iron, termed a "tie-plate," extending from the outer edge of one flange to the outer edge of the other, as exhibited at *a*, in the transverse section, fig. 2. Additional security may be obtained by turning up the tie-plate at the edges, as in fig. 3; and by forming a projection or ridge along the centre of the tie-plate, to enter the cavity of the rail, as shewn at figs. 4, and 5. The tie-plates may either extend beneath the whole length of the rails, or they may be applied in short pieces at intervals, as represented at fig. 6, which is a side view of part of one of the rails; and the tie-plates may be secured to the flanges by bolts or rivets; but the patentee prefers to weld them together, by the process described in the specification of a patent granted to him August 1st, 1844.

The patentee claims the construction of rails, as above described, for railway carriages to run upon, consisting of a bar of iron, formed into a hollow ridge of any suitable section, with a horizontal flange on each side, at the base of the ridge; the flanges being connected together, either throughout their length or at intervals, by a plate of iron, called a tie-plate.

The second part of the invention relates to the construction of wheels intended to run upon common roads and railways. Fig. 7, represents part of a wheel for running on common roads; the improvement consists in forming the spokes as "sectoral-shaped loops" of corrugated or hollow iron, of any form in section; or of flat, round, or oval rods of iron; or of angle or T-iron. These spokes are placed with their flat sides in contact, and radiating from the centre of the wheel, and are fastened together by bolting, rivetting, or welding; the nave is then cast upon the inner ends of the spokes; after which, the spaces *b*, at the junctions of the outer part of the spokes, are filled, or partly filled, with wood, iron, or other suitable material; and a tire, put on in the usual manner, completes the wheel. Sometimes, instead of filling the spaces *b*, the patentee fastens a circle of wooden felloes upon the outer part of the spokes, and then applies the tire.

The second improvement in the construction of wheels relates chiefly to those for railway carriages; but it is also applicable to wheels for travelling on common roads. Fig. 8, exhibits part of a railway wheel constructed according to this improvement; it is made with sectoral-shaped loops, like the wheel just described, with the addition of a radial spoke *c*, between every pair of sectoral spokes.

The third improvement in wheels has for its object, to obtain a nave of as large diameter as possible with a given weight of iron. Fig. 9, is a vertical section of a nave, constructed according to this improvement. *d, d*, are blocks of pumice-stone or bath-brick (or any other material that will admit of metal being cast around it without "blowing"), inserted between the spokes *e, e*, when placed in the mould for casting; the nave is cast around these blocks and the ends of the spokes; and thus the blocks are hermetically enclosed by the iron:—the difference between the weight of the two materials being great, it will be readily understood that a given weight of iron may be more profitably employed than heretofore; or that, with a given strength, the weight of iron may be lessened.

Under this part of the invention, the patentee claims, Firstly,—the constructing of wheels for common road carriages with spokes of corrugated or hollow iron, of any form in section; or of flat, round, or oval rods of iron; or of angle or T-iron, bent into the form of sectoral loops; the straight sides of each pair of loops lying in contact, and (preferably) rivetted or otherwise fastened together. Secondly,—the constructing of wheels for railway and common road carriages with spokes formed as sectoral loops, of corrugated or hollow iron, of any form in section; or of flat, round, or oval rods of iron; or of angle or T-iron, with a straight radiating spoke inserted between, and in contact with, the straight sides of each contiguous pair of looped spokes. Thirdly,—the casting the naves of railway and common road carriage-wheels round blocks of pumice-stone or other suitable material, inserted between the ends of the spokes in the mould previous to casting.

The third part of the invention relates to the construction of the bodies of railway and common road carriages, and consists in forming the ribs or standards of corrugated iron, to the flanges or edges of which the panelling of the carriage is bolted or rivetted, as represented in the sectional view, fig. 10. This improvement is also applicable to the building of iron ships or vessels, by forming the ribs of the same of corrugated iron, and bolting or rivetting the transverse plates, or sheathing, thereto.

The patentee claims the employment of corrugated iron for forming the ribs or standards of carriages for railways and common roads, or the ribs of iron ships or vessels.

The last part of this invention consists in certain apparatus for forming the sectoral-shaped spokes before described. Fig. 11, is a plan view of the apparatus. *f, f,* is the framing, furnished with guides *g, g,* on which the bed-plate *h,* traverses; motion being communicated through the winch *i,* and wheels *j, k,* to a shaft which carries a pinion in gear with a rack fixed on the under side of the bed-plate; and, by this means, the latter is moved to and fro. *l,* is a mould or shape, for forming the interior of the spokes, fixed upon the upper surface of the bed-plate. *m,* is a concave block, for moulding the exterior of the spokes at the crown of the arch; it works between guides *n, n,* and is adjusted by means of the screw *o*. *p, p*, are two bent levers, turning on pins *q, q*, fixed in the bar f^1; the short ends of these levers carry two spindles, on the lower ends of which the rollers *r, r*, are mounted; to the long ends of the levers the ropes *s, s*, are attached, which pass over pulleys *t, t*, connected to the ends of the bar *u*; and from the lower ends of the ropes two weights are suspended. The piece of iron to be made into a spoke is placed, at a red heat, between the large end of the mould *l*, and the block *m*, (the middle of the piece of iron corresponding with the middle of the mould *l*,); and the block is firmly screwed up against the iron, in order to press it to the shape of that part of the mould which is opposite the block; the bed-plate *h*, is then set in motion, by turning the winch *i*, so as to bring the mould between the rollers *r,r*, which are caused, by the action of the before-mentioned weights, to press the iron to the sides of the mould, as it passes between them, and thereby produce a spoke of the desired shape. After the mould *l*, has passed between the rollers, the latter come in contact with the wedge-shaped piece *v*, fixed to the bed-plate *h*, whereby they are forced apart, so as to admit of the spoke being removed. The mould *l*, block *m*, and rollers *r, r*, may be grooved, in order to produce various kinds of moulding on the spoke, or to suit iron of any form. Instead of the framing *f*, being placed horizontally, it may be vertical.

Fig. 12, is a plan view of another arrangement of machinery for making the spokes. In this case, only one lever *p*, with its roller *r*, is employed; the bed-plate *h*, on which the mould *l*, is fixed, does not slide past the roller, but turns upon a pivot at *w*, (motion being communicated to it by means of the winch *x*, worm *y*, and worm-wheel *z*,); the block *m*, is dispensed with; and the lever *p*, being acted upon by an adequate weight, presses the red-hot iron against the mould during the entire revolution of the bed-plate; and thus the spoke is formed.

The patentee claims, under this head of the invention, for the purpose of forming the spokes of the improved wheels, Firstly,—the combination of a sliding-table and mould, moving between two pressing-rollers, actuated by a pair of levers, as above described. Secondly,—the combination of a table turning upon a pivot, and carrying a suitable mould, with a pressing-roller, actuated by a lever, as above described.—[*Inrolled in the Inrolment Office, October,* 1847.]

To DANIEL SYDNEY HASLUCK, *of Birmingham, in the county of Warwick, merchant, for certain improvements in the manufacture of harness for beasts of burden,—being a foreign communication.*—[Sealed 13th August, 1846.]

THESE improvements in the manufacture of harness consist in constructing the framing or foundation, and some other parts of the harness, principally of metal; and in a novel mode of attaching the leather parts thereto.

In Plate XV., fig. 1, is a perspective representation of that part of the harness which the inventor denominates the "crutch-part" of the saddle-tree, and which is, in fact, the foundation of the harness; and fig. 2, is a perspective view of the cantle, or what is generally known as the seat or saddle; both these parts are constructed of metal, and are connected together, when the harness is complete, in the manner hereafter described. The metal or iron foundation, or "crutch," has holes made in it in various places, to receive the fastenings whereby the other parts of the harness are attached to the foundation. The crupper-loop is connected to the hinder part of the metal foundation *a, a,* by means of a square-headed projecting stud *b,* which is firmly secured to the foundation, and passes through a square hole, made at the inner end of the crupper-loop piece, which is further secured by a screw at *c,* that also assists in connecting the cantle or seat to the foundation, as will be hereafter more fully explained. *d,* is a hole for receiving the fastening which connects the fore part of the cantle to the foundation, and also serves for securing the hook for the bearing-rein; *e, e,* are holes for receiving screws, whereby the leather is fixed to the metal foundation; and *f,* is a groove or countersunk part made in the framing, on each side, for the purpose of receiving the back-band, which is secured by a screw that carries the terret, and is screwed into the holes *g*;—a part of the metal at the upper part of the crutch or foundation is cut away at *h*, for the purpose of reducing the weight of this part of the harness. Fig. 3, represents, in section, the method of attaching the leather flaps or skirts to the metal foundation. The large flap or skirt is seen at *i*, *i*, and the smaller, or short flap or skirt, at *j*. These two flaps or skirts are connected together by stiching, as shewn in fig. 4; and they are both secured to the upper part of the foundation or crutch by means of screws *e*, *e*. The back-band *k*, runs under the small skirt or flap, and between it and the larger one, and is secured to the foundation, as before mentioned, by the screwed end of the terret, which passes through the two flaps or skirts *i*, and *j*, and the back-band *k*, and enters the hole in the metal foundation, seen at *g*, in fig. 1. When the leather flaps or skirts have thus been properly attached on both sides of the framing, the cantle or seat *l*, is secured in its place, as seen in figs 4, and 5. The attachment in front is effected by means of a screw or bolt *m*, which passes through the hole *d*, in the cantle, also through a hole at the inner end of the bearing-rein hook *n*, (figs. 4, and 5,) and terminates in the hole *d*, (fig. 1,) in the metal foundation; at the back, the connection is made by means of the screw which enters the hole *c*, seen in fig. 1. When all the parts are secured together, in the manner just described, and shewn in fig. 4, the saddle will be complete, with the exception of the pad, which is placed inside, and is attached in the manner usually adopted when the ordinary wooden trees are employed.

The patentee claims the peculiar method, above shewn and described (or any modification thereof), of constructing harness for beasts of burden; and connecting together the several parts of which the same is composed, in the manner above set forth.—[*Inrolled in the Petty Bag Office, February,* 1847.]

Specification drawn by Messrs. Newton and Son.

To Isham Baggs, *of Holford-street, Holford-square, Pentonville, in the county of Middlesex, Gent., for certain improvements in the production and management of artificial light.*—[Sealed 7th May, 1847.]

This invention relates to the production of light by the combustion of naphtha or similar essential oils, and consists in an improved construction of lamp for burning the same; and also in an apparatus for producing and igniting the vapour of the naphtha, or other essential oil, when the lamp is required to be used.

In Plate XIV., fig. 1, is an elevation, and fig. 2, a plan view of the lamp. *a*, is a vessel, in which a constant supply of naphtha is to be kept at a uniform pressure, as it has been heretofore proposed; in the upper part of this vessel a bent tube *b*, is fixed, having, at its outer end, an orifice, through which the vapour of the naphtha rushes with considerable velocity: the vessel may be furnished with several tubes *b*; or the tube *b*, may have several branches, with an orifice at the outer extremity of each. The vapour, as it rushes out from the tube *b*, when under considerable pressure, will not burn, and some instrument is necessary to obstruct the flow of vapour, and cause it to become mixed with atmospheric air. The contrivance adopted by the patentee for this purpose consists of a frame *c*, capable of being adjusted in height above the orifice of the tube *b*, by means of the rack *d*, and pinion *e*; and this power of adjusting the distance between an obstructing instrument and the orifice from whence the vapour flows, constitutes one peculiarity of this apparatus. The instrument *c*, consists of a series of small bars, but other open or reticulated apparatus may be employed. The supply of naphtha is kept up by the pipe *f*, connected with a vessel placed sufficiently high or otherwise arranged for obtaining the requisite pressure; and upon the pipe *f*, is fixed a three-way cock *g*, by means of which the naphtha can be admitted into the vessel *a*, or drawn off therefrom.

To produce and ignite the vapour of naphtha or other essential oil in the lamp, the apparatus shewn in plan view at fig. 3, and in vertical section at fig. 4, is used. Pyroligneous ether, spirit of wine, or other suitable liquid, is introduced into the compartment *h*, of the apparatus (which can be done by removing the handle *i*, and pouring the liquid through the socket formed to receive the same); a small quantity of spirit is put into the compartment *j*; and some spirit is also put into the vessel *k*, together with metal filings or other substance that will retain the spirit between its particles and prevent spilling. The spirit in the compartment *j*, and vessel *k*, being ignited, vapour will be generated in the compartment *h*, and rush out of the tube *l*, through the opening *m*, where it meets with the flame rising from the vessel *k*, and deflects the same outwards; the apparatus is then to be held in such a position that the flame will strike against the upper part of the vessel *a*,—and as soon as the vapour ascends from the orifice of the tube *b*, through the instrument *c*, it will be ignited by the flame from the vessel *k*; after which, the lamp will generate its own vapour, by the heat from its flame acting on the vessel *a*. The patentee says that, although the apparatus shewn at figs. 3, and 4, has been found to answer the purpose very well, he does not confine himself thereto, so long as the blow-pipe principle be retained.

The patentee claims, Firstly,—the so arranging and applying apparatus *c*, in respect to the outlet of the vapour, that the same may be adjusted from time to time, as circumstances may require. Secondly,—the application of a three-way cock, as described. Thirdly,—he claims the apparatus, such as described, for producing and igniting the vapour of naphtha or other like liquid, as described.—[*Inrolled in the Inrolment Office, November,* 1847.]

To John Ryan, *of the Royal Polytechnic Institution, Doctor of Medicine and Professor of Chemistry, for improvements in the preservation of organic and other substances.*—[Sealed 17th October, 1846.]

This invention consists in preserving organic and other substances by the introduction of certain gases into the cases or vessels containing the same.

The gases used in carrying out the invention are those which are called non-supporters of combustion; and the patentee prefers to employ a mixture of carbonic acid and hydrochloric acid, or of carbonic acid and acetic or pyroligneous acid. A mixture of carbonic and pyroligneous acids, in a gaseous form, is preferred, for preserving animal matters, on account of the presence of a small quantity of creosote in the pyroligneous acid; and, in some cases, to this mixture a little creosote is added, so that it will pass over with the gases, from the vessel in which they are generated, into the vessel containing the animal matters to be preserved. The carbonic acid is obtained by operating on carbonate of lime in the form of marble. To the marble the patentee sometimes adds common hydrochloric acid, diluted with half its bulk of water; whereby a mixture of carbonic and hydrochloric acid gases is obtained; and to this a small quantity of creosote may be added, if considered requisite, in the proportion of half a drachm of creosote to two quarts of the mixture: the mixed acids will carry over with them a portion of the creosote vapour, in which condition it will not communicate any taste or odour to the matters to be preserved. Or the carbonic acid may be obtained from the marble by the use of rough or unpurified pyroligneous acid, which contains a small quantity of creosote (whereby a mixture of carbonic and pyroligneous acids and the vapour of creosote is produced); but when rough pyroligneous acid cannot be obtained, acetic acid, to which has been added half a drachm of creosote to every two quarts of the acid, or common vinegar, with the same quantity of creosote, may be employed.

When vegetable substances, or fermented liquids, are to be preserved, carbonic acid alone must be used; and for fermented liquids, such as beer or wine, it has been found requisite to wash the carbonic acid, by passing it through a vessel containing clear water, in order to free it from any hydrochloric or acetic acid. When organic matters, such as meat, are to be preserved, they must be put into a suitable air-tight receptacle connected with the apparatus in which the gases are generated.

In Plate XIII., a vertical section of the apparatus employed for generating the gases is shewn. It consists of a vessel *a*, made of glass, or other suitable material, for containing the acid; within this vessel there is another vessel *b*, which is to be partly filled with broken pieces of marble, and it is furnished with a perforated bottom, in order that the acid may ascend within it, and come into contact with the pieces of marble; and a communication is established between this vessel *b*, and the air-tight safe or box containing the matters to be preserved, by means of the bent pipe *c*, (provided with a stop-cock) and the flexible tube *d*. The vessel *a*, is charged with acid through an aperture at *e*, which is closed by a screw when the apparatus is in action; and the pieces of marble are introduced into the vessel *b*, at the top, after the cover *f*, of the vessel *a*, has been taken off. If preferred, the tube that is connected with the air-tight safe or box may enter at the bottom of the apparatus, and its upper end may terminate within the vessel *b*, near the top of the same.

The following is the action of the apparatus:—So long as the safe-door is kept open, the pressure of the air or gas on the liquid in the vessel *a*, causes it to ascend through the perforated bottom of the vessel *b*, and come into contact with the pieces of marble; and the gases thereby evolved pass through the tube into the safe. When the door is closed, the safe becomes filled with the gases mixed with air; and when it will not contain any more, the pressure of the gas upon the liquid in the vessel *b*, will be sufficient to drive it out of that vessel (through the perforated bottom) into the vessel *a*, leaving the pieces of marble dry;—the generation of the gases therefore ceases; but it commences again on the safe-door being opened, or in case of any leakage occurring; so that the safe or other receptacle will always be charged with the gases. For preserving fermented liquids, the gas is introduced into the cask containing the same.

The patentee states, that when preserving meat in cases, it is advisable to use considerable pressure: he therefore employs an apparatus made of wrought-iron, or pure lead, capable of bearing a pressure of from six to eight atmospheres. The tube from the gas-generating apparatus is connected with the case containing the meat, and a small hole having been made in another part of the case, the gases are admitted; when the gases have driven out the atmospheric air through the hole, the same is to be closed by soldering or other means; the admission of the gases is to be continued until the required pressure is obtained (say about two atmospheres); and then the communication with the gas-generating apparatus is to be broken, and the opening through which the gas entered is to be closed by means of a stop-cock, or by solder. For preserving provisions fresh at sea several tanks or safes of iron, or other suitable material, connected by tubes with one large gas-generating apparatus, may be employed; each tube being provided with a stop-cock, to cut off the supply of gas to the tank from which the meat is to be taken.

The patentee says, he does not claim the preserving of organic or other substances by the application of carbonic acid, hydrochloric acid, or other gases, nor the apparatus by which the same may be generated; but what he claims is, First,—the preserving of organic and other substances by supplying thereto a mixture of the gases, acids, or vapours, in the manner above described; and, Secondly,—the constructing of a self-acting apparatus for generating the gases, and its application to supplying the receptacle containing the substances to be preserved, as above described.—[*Inrolled in the Inrolment Office, April*, 1847.]

To Robert Heath, *of Manchester, in the county of Lancaster, Gent., for certain improvements in wheels, to be used upon certain rail and other roads; which improvements are also applicable to mill-gearing and other similar purposes.*—[Sealed 27th July, 1846.]

This invention, which is applicable to carriage-wheels, and also to mill-gearing, consists in the peculiar formation of the wheels, in connection with the particular relative proportions of the different parts of the same, whereby the contraction consequent upon the cooling of the metal in casting is caused (instead of weakening the wheel) to bind the whole together into one solid mass. The wheels are in the first place formed entirely of cast-iron; and, although any kind of metal may be used, the patentee prefers to make them of what is called "cold-blast" metal, as being stronger and tougher than any other. The proportions which the patentee employs, and which he claims as his invention, are as follows:—The outer rim and the boss of the wheel are three times the strength of the arms, or thereabouts. Hitherto, cast-iron wheels have been liable to break, chiefly from want of a sufficiency of metal in the rim; because, when the rim is not sufficiently strong, it cools first during the process of casting, and the contraction of the rim ceases, while the contraction of the arms and boss are still going on. By making the rim three times the strength of the arms, or thereabouts, the contraction of the rim is greater, and lasts longer than that of the arms; and thus the arms and boss of the wheel are bound firmly together by the contraction of the rim. This perfect contraction of the whole causes the rim to assume a correct circular form, so as to require no subsequent turning prior to use. The arms may be made either flat, round, or of any other shape; but they must retain the same sectional thickness at the rim as at the boss, and without any flanges or ribs, so that the arms shall not contract more or sooner at one place than at another. It is also preferred to make the wheels with an uneven number of arms, so as to assist the contraction of the rim; that is, having each arm opposite to the space between the two opposing arms. In making the driving-wheels for locomotive engines, a ring of metal is cast about half-way between the outer rim and the centre of the same, to prevent the thrust of the crank from breaking the arms; and this ring is made a little stronger than the arms; still preserving the above-named proportions of the outer rim, arms, and boss. Of course, it will be evident that the above proportions are applicable to the casting of wheels and pulleys, for mill-gearing, and also to railway turn-tables, and other similar articles requiring strength.

The patentee remarks, that he does not claim as his invention simply forming the wheels entirely of cast-metal, nor does he claim the dimensions or proportions of any one particular part; but he claims the combination of the whole;

that is to say, a wheel formed entirely of cast-metal of the above relative proportions, viz., having the rim and the boss each three times the strength of the arms, or thereabouts (whatever may be the diameter of the said wheel), and having the arms of the same of an equal sectional figure or thickness throughout, whatever may be the number or form of the said arms.—[*Inrolled in the Petty Bag Office, January,* 1847.]

To ROBERT WILSON, *of Woodhouses, in the county of Lancaster, weaver, for his invention of certain improvements in looms for weaving velvets and other piled goods; and in the machinery or apparatus for cutting the pile or nap of the same.*—[Sealed 8th October, 1846.]

THIS invention of improvements in looms for weaving velvets and other piled goods applies particularly to the manufacture of plush or long-napped velvets, such as are used for covering hat-bodies, and commonly called "hat-plush;" and consists in providing the loom with a double set of healds or harness, with corresponding treadles and jacks, a double set of ground or back-warp threads, and a double set of pile or nap-warp threads. The healds or harness must be so trodden or wrought, that the weft shall form, with these threads, two separate pieces of cloth at one operation of the weaver; each cloth, when cut, having a distinct pile or nap,—the pile or nap of each cloth being composed of every alternate thread of the warp; that upon the second or lower piece of cloth interweaving with, and forming loops upon, the surface of the upper cloth. These pile-loops being cut during the operation of weaving, as usual, and the double edges or selvages of the cloth formed by the weft-thread being also severed, the two pieces of cloth may be separated from each other; the pile or nap of the lower piece being drawn through the ground or back of the upper piece. Thus, the two pieces of piled cloth or fabric are woven in the same loom, and completed at one operation. Of course it will be evident that three or even more pieces of velvet, or other piled goods, may be woven in the same manner, at one operation, by introducing three or more sets of healds or harness, with their corresponding jacks and treadles, and three or more sets of pile and back-warps or threads into the loom; but this would greatly deteriorate from the quality of the cloth, by the want of closeness or density of the pile or nap. The improvements in the machinery or apparatus for cutting the pile or nap of such goods or fabrics consist in furnishing the cutting-knife or "travat" with two or more blades, so as to enable the weaver to cut two or more rows of loops of pile-threads at once; whereby, not only will a saving of time be effected, but also, as the blades are always placed in a frame or handle parallel to each other, the weaver will be enabled to cut the pile or nap of the fabric with more regularity and precision than when a single cutting-knife or travat is employed for that purpose.—[*Inrolled in the Petty Bag Office, April, 1847.*]

Specification drawn by Messrs. Newton & Son.

To RICHARD WALKER, *of Rochdale, in the county of Lancaster, cotton spinner, for his invention of certain improvements in apparatus for the manufacture of gas for illumination; which said improvements are also applicable to the manufacture of other products of distillation.*—[Sealed 26th January, 1847.]

THIS invention is designed to prevent the "choking" of the ordinary ascending pipe or tube, which conveys the gas, arising from the distillation of coal, from the retort to the purifier. The choking or "baking-up" of the ascending pipe is caused by the accumulation and incrustation of tar and other carbonaceous matter, which, under ordinary circumstances, descend the said pipe; and which, besides the delay caused by frequently removing the same, are often productive of dangerous results, such as the bursting of the upright pipe, and sometimes of the retort itself. The prevention of the accumulation of tar, &c., in the pipes, and keeping the passages clear at all times, allows a greater quantity of gas to be evolved from the coal in a given time; and thereby effects a great saving in the quantity of fuel required to heat the retort. The improvement consists in breaking the immediate connection between the inner surface of the retort and the ascending pipe, by causing the upright or ascending pipe, leading from the retort to the purifier, to project or protrude inside the retort, instead of the end of the pipe being flush or even with the upper side of the retort; which improvement allows free egress to the gas, but prevents the tar or other carbonaceous matter from ascending the upright pipe, and choking up the same.

The patentee has appended to his specification a drawing illustrating the improvement; but the mode of carrying out this invention will be clearly understood, when it is stated, that the lower end of the ordinary upright pipe, which conveys the gas from the retort to the purifier, passes through the upper side of the retort, and projects about two inches inside thereof. When, therefore, the tar ascends the sides of the retort, instead of passing up the upright pipe, as heretofore, it falls from the end of the same (in consequence of the immediate connection being broken or interrupted) on to the bottom of the retort, from whence it is easily removed.

This invention, as will be evident, is equally applicable to the manufacture of all the products of distillation, wherein an upright or ascending-pipe is employed to convey such products evolved from a retort.

The patentee claims, breaking the immediate connection between the inner surface of the retort and its ascending or upright pipe, by means of a projection of or from the end of such pipe, or otherwise; whereby the tar or other carbonaceous matters are prevented from creeping up or following the surface of the pipe.—[*Inrolled in the Petty Bag Office, July,* 1847.]

Specification drawn by Messrs. Newton and Son.

To John Thomas Gray, *of Wardour-street, in the county of Middlesex, boot-maker, for an improved boot and shoe.*—[Sealed 14th May, 1847.]

The object of this invention is to prevent boots and shoes from being worn away at one side only, by the wearer tread-ing unevenly; it consists, first, in the construction and application of a rotary heel, which, when it has been worn away to a slight extent at one side, can be turned partly round, so as to present a fresh portion of the under surface in place of that which has been worn away; secondly, in the application to the soles of boots and shoes, of rotary surfaces, constructed in a similar manner to the rotary heel, and employed for the same purpose.

In Plate XIII., fig. 1, exhibits a vertical section of one of the rotary heels applied to a boot; and fig. 2, is a plan view of the sole ready for receiving the rotary heel. When the boot or shoe is in a sufficiently forward state of manufacture to receive the rotary heel, a ring of leather *a*, is fixed to the sole by nails, pins, or other suitable means: in the recess *b*, thus formed, a ring of metal or other suitable material is placed, having a number of pins projecting therefrom, by which the succeeding pieces of leather *e*, and *f*, are fixed in their places; the inner edge of the metal ring is bevilled, to correspond with the bevilled periphery of another metal ring *g*, which, being fixed by means of screws, will retain the first-mentioned metal ring in its position, but at the same time permit it to be moved round, with the piece of leather attached thereto, when required:—the bevilled surfaces of the metal rings are truly turned and ground together, in order to ensure a uniform friction in their working, which will at all times be sufficient to prevent motion resulting when in use, and yet admit of the heel being readily turned by the hand. A ring of leather *e*, is placed on the pins with which the metal ring before-mentioned is provided, and the internal space is filled with a piece of leather, which may be readily removed in order to get at the screws for holding on the ring *g*, without disturbing the ring *e*; and, lastly, the top or heel-piece *f*, is fixed on the pins.

The second part of the invention is shewn at figs. 3, and 4; fig. 3, being a plan view of the under side of the sole of a boot, having two revolving surfaces *j*, *k*, (constructed in the same manner as the rotary heel above described) attached thereto; and fig. 4, is a side view of the same.

The patentee states that he does not claim the principle of the rotary heel for boots and shoes; but he claims the peculiar form and combination of the several parts, and particularly the attaching of the moveable part of the heel to the fixed part thereof, by means of bevilled surfaces, as above described; also the application of moveable surfaces to the soles of boots and shoes, as represented at figs. 3, and 4, and constructed in manner similar to the heel.—[*Inrolled in the Inrolment Office, November*, 1847.]

To FENNELL ALLMAN, *of* 18, *Charles-street, St. James's-square, in the county of Middlesex, consulting engineer, for an improved mode of making, forming, and shaping candles.*—[Sealed 4th May, 1847.]

THIS invention consists in forming candles of cold or solid materials; also in making candles with a shell or casing of good material filled with an inferior material; and likewise in using wires when making dip candles, for the purpose of forming the same with twisted wicks.

The materials adapted for being used in a cold state for making candles are, wax, sperm, stearine or stearic acid, and mixtures of the same; but care must be taken that there is no elain or olein present, as it would prevent the materials from becoming firm when subjected to pressure. In Plate XV., fig. 1, is a horizontal longitudinal section of the machine employed for making candles from cold materials. It consists of a cylinder *a*, for containing the fatty matter, furnished with a hemispherical cap *b*, and fitted into the casing *c*; the cylinder being retained in its proper position, while the candles are being made, by two ears or lugs a^1, a^1, which enter into vertical grooves in the casing *c*; and this arrangement admits of the cylinder being raised when empty, in order that it may be refilled with fatty matter. To the cap *b*, a tube *d*, is fixed, through which the fatty matter is forced by the ram *e*; and by this means the candle is formed around the wick *f*. The wick is supplied by the reel *g*, from which it passes round the guide-roller *h*, through a passage formed in the flange of the cylinder *a*, and in the bar or bridge *i*, and is introduced into the tube *d*, by the nozzle *j*. The ram *e*, is actuated in the same manner as the ram of an ordinary hydraulic press, viz., by forcing water into the cylindrical cavity *k*, through the passage *l*; and when it is required to be drawn back into the recess *m*, in order that the cylinder *a*, may be raised, for the purpose of being refilled, the water is discharged through the passage *n*, and the ram is drawn back by the counterbalance weight *o*, which is suspended from a rope *p*, that passes over the pulley *q*, (supported by any suitable framing), and is connected by the rod *r*, with the ram. Upon the end of the ram a steel cup ring *s*, is fixed, by the ring *t*, being shrunk on; and the pressure of the hard fatty matter forcing the ring *s*, against the interior of the cylinder *a*, the ram *e*, is thus tightly packed.

As the continuous cylinder of fatty matter, with the wick enclosed in it, is forced out of the tube *d*, it is cut into pieces of a suitable length to form the candles; and a conical end is formed to each piece by means of the apparatus represented at fig. 2. It consists of two curved cutters, fixed to a chuck on the end of the mandril *u*, which is caused to rotate by a band passing around the pulley *v*; the candle is pushed through a hole in the guide *w*, against the cutters, and the end is thus brought to the required conical shape.

Fig. 3, is a section of a cap *b*, which is to be applied to the cylinder *a*, fig. 1, when shells or skins of candles are to be made. In this instance a cylindrical rod *x*, is fixed to the bridge *i*; the rod *x*, nearly fills the tube *d*, leaving a narrow annular space through which the fatty matter is forced by the action of the ram, and is thus caused to assume a tubular form. The tube of fatty matter is cut into suitable lengths, and each portion is filled with softer and inferior materials by means of the apparatus shewn at fig. 4. The shell or skin *a*, is placed in the tube *b*, with its lower end resting on the tin bottom *c*, by which the conical end of the candle is to be formed; the wick is carried upwards from the reel *d*, through the centre of the shell, and is secured to the arm *e*; the casing *f*, surrounding the shell, is filled with cold water; and the inferior materials, in a melted state, are introduced into the shell. When the whole has become solid, the candle is removed from the apparatus.

Fig. 5, exhibits the mode of employing wires in the manufacture of dip candles. *a*, *a*, are the wires, which pass through openings in the bar *b*, and are held by set-screws *c*, *c*. The wick is first passed over one of the screws *c*, then down one side of the wire belonging thereto, through a notch in the lower end of the same, up the other side, and again over the screw *c*, as shewn at B; the wick then passes to the next screw, and this process is repeated. When all the wires have been supplied with wick, they are each turned, by means of the disc *d*, in order to twist the wicks, as represented at C;—A, shews the wire without the wick. The dipping of the wicks into the melted fat is carried on in the ordinary way (the bar *b*, being suspended by a pivot *e*, at each end); and when the candles have been made, the wicks are cut by the application of a knife opposite the recesses *f*, *f*, in the bar *b*.

The claims made by the patentee are as follows:—"Firstly, I do claim the making, forming, or shaping candles or parts of candles from wax, and all mixtures containing more than ten per cent. of wax, by forcing the said material in a cold or solid state through suitable tubes or apertures, as in fig. 1. And, Secondly,—I claim any arrangement of apparatus in which this material escapes, in a cold or solid state, from mechanical pressure or force through apertures or tubes, giving the longitudinal shape to candles or parts of candles. Thirdly,—with respect to the other materials specified, viz., sperm, stearine of tallow, lard, &c., and their mixtures, and when combined with ten per cent. or under of wax, &c., I claim, generally, the application of mechanical force or pressure to these said materials, when in a cold or solid state, for the purpose of forming or shaping these said materials into candles or parts of candles. Fourthly,—I claim the application of mechanical force or pressure to the materials specified in claim third, for the purpose of driving them from close vessels through tubes or apertures, for the purpose of making, forming, and shaping candles. Fifthly,—I claim, as my invention, shells or skins, as described, of a good material, viz., such materials as I deem to be suitable for my cold process, and the casting therein or filling the same with a material inferior in quality or price. Sixthly,—I claim the employment of wires for dipped candles, around which the candle is formed."—[*Inrolled in the Inrolment Office, November*, 1847.]

To Elijah Galloway, *of Buckingham-street, Strand, civil engineer, for improvements in rotatory engines, and in locomotive carriages and railways.*—[Sealed December 14th, 1846.]

This invention refers, firstly, to a novel construction of rotary engine; secondly, to an improvement on a former patent for locomotive engines; and, lastly, to an improvement on the railway over which such locomotive engines are intended to run.

In Plate XV., the rotary engine is represented in several views. Fig. 1, is a vertical section, taken through the middle of the engine; fig. 2, is a horizontal section of the same; and fig. 3, is a plan view, the upper part of the casing being removed. The inventor has appended to his specification several colored diagrams, shewing the relative situations of the various parts during the operation of the engine; but, from the following description, the construction and mode of working of the engine will be fully understood. *a, a*, is the circular external casing of the engine; and *b, c*, are the end plates or covers. *d*, is a peculiarly-formed case, affixed by bolts to the external casing, and intended to perform the office of the cylinder in an ordinary engine; and within this case a piston *e*, works, the periphery of which is provided with arms, which form five semi-circular recesses or indentations, as shewn at figs. 2, and 4. To the upper surface of this piston a circular flat plate *f*, is bolted, and a corresponding plate is attached to the bottom of the case *d*. In the centre of the plate *f*, and the piston *e*, one end of a crank-shaft *g*, is inserted; its bearing being in the cover *b*, of the casing *a*. This crank-shaft *g*, has a groove formed in that part which enters the piston, for the purpose of receiving a segmental piece *h*, (fig. 2), which forms a key, and has a tendency to be pressed outwards by a spring lying in the bottom of the groove. The central opening in the piston for the reception of the crank-shaft is made larger in diameter than the shaft, to allow of the action of the spring in the groove of the shaft; which spring is intended to keep the piston in contact with its case *d*, and ensure its proper working. *i*, is the entrance-pipe for the steam, and *k*, the exit-pipe. *l*, *l*, are five circular holes, made through the plate *f*, (equidistant from its centre), for the purpose of admitting steam to the interior of the case *d*, to act upon the piston *e*; and a similar number of holes *m*, are made in the upper flange of the case *d*, (as shewn by dots in fig 3,) to allow of the escape of the steam to the exit-pipe. The plate *f*, is provided at its under surface (see fig. 4,) with peculiarly-formed grooves or recesses *n*, which are so situated with regard to the holes *m*, as to form, together with these holes *m*, exit passages (at certain periods of the working of the engine) for the steam which has exerted its elastic force upon the piston. Now, suppose steam to be admitted into the case *a*, through the pipe *i*, the steam will pass down such of the holes *l*, as are not closed by the top flange of the case *d*; that is to say, when one of those openings is over a curved recess or chamber formed in the periphery of the case *d*, as shewn at fig. 2; steam will be admitted into that case, and exert its elastic force on those arms of the piston which are so situated as to bar its further progress. By this means, the piston will be forced round part of a revolution, together with its plate *f*; which, by this movement, will bring one of its curved grooves *n*, immediately over an opening *m*, in the flange of the case *d*, (see fig. 3,) and thus a passage will be formed for the escape of the steam from the interior of the case *d*, to its exterior, and thence out of the engine by the pipe *k*. While this escape is going on, the hole or holes *l*, which had let in the steam, will have been closed, by coming over a solid part of the flange of the case *d*; but, at the same time, one or more holes *l*, will have been brought into communication with the interior of that case, and thus a further supply of steam, to act upon other arms of the piston *e*, will have been admitted to the case *d*, whereby a continued rotary motion is communicated to the piston and its crank-shaft.

The second part of the invention relates to an improvement on a former patent, granted to the present patentee 18th April, 1846, in the specification of which he describes a mode of propelling locomotive engines by the use of horizontal driving-wheels. These wheels were pressed by springs against a rail, laid intermediate between the ordinary rails of a railway; but, instead of such horizontal wheels, the patentee proposes to alter their position, by inclining them at any convenient angle; the object being, to keep them more clear of the ground, and to render their contact with snow, or other matters lying on the railway, less likely than when mounted in a horizontal position.

The third part of the invention refers to the middle or intermediate rail, and consists in making the working faces thereof of steel. This he effects, by piling on, or uniting with, that part of the rail which receives the bite of the wheels, thin bars or strips of steel; the whole being brought to a welding heat, and subjected to any well-known process for uniting the metals.

The patentee claims, First,—the mode, above described, of constructing rotatory engines. Secondly,—the application to locomotive engines of inclined driving-wheels; such wheels being pressed by springs against a central rail, as described. And, Thirdly,—applying steel to the side surfaces of a central rail, for the purpose above described.—[*Inrolled in the Inrolment Office, June,* 1847.]

Scientific Adjudication.

VICE CHANCELLOR'S COURT,

Before Sir L. SHADWELL,—November 13th, 1847.

HADDAN *v.* SMITH AND WILLEY.

It appeared, from the bill filed in this case, that the plaintiff, being proprietor of two patents (one of which had been assigned to him by Tayler the patentee), granted a license to the defendant Smith to use the two inventions comprised in the patents, so far as they were applicable to making railway carriage wheels. By the license, certain accounts were to be periodically rendered to the plaintiff, of the wheels made under the license, and a license duty paid upon every pair of wheels so made. The license also provided that the licensee should pay certain specified penalties for wheels upon which the licensee should not put the plaintiff's name, as provided by the license. At the time the license was granted, it was agreed, that if Smith, the licensee, should take a partner, the license should terminate; but, upon Smith subsequently entering into partnership with the other defendant, this agreement was dispensed with, and the two defendants, as partners, continued for some time to work under the license, and pay license duties.

About a year ago, some other parties made some wheels, which the plaintiff deemed to be infringements of the patent assigned to him by Tayler, and he accordingly filed a bill in Chancery against them, to restrain the infringement. In this suit the defendant Smith made an affidavit in support of the plaintiff, in which he stated that the invention comprised in the patent granted to Tayler was both new and useful. The plaintiff, after this, entered a disclaimer of part of the invention comprised in Tayler's patent, but which did not, in any way, affect any of the wheels which the defendants had made under the license, nor did it at all relate to the plaintiff's other patent, to which the license extended. After the entry of this disclaimer, the defendants refused to return to the plaintiff any further account of wheels made under the license, either before or after the disclaimer, or to pay him any further license duties. This bill was consequently filed, to compel the defendants to render an account of all the wheels which they had made and sold since the rendering of the last account; and also to compel them to pay the license duties which had become payable in respect of such wheels, and also the penalties which they had incurred by making certain wheels without putting the patentee's name upon them, as required by the license. The plaintiff's bill not only prayed for such an account, but also prayed that in case the defendants should repudiate the license as not binding upon them, they might be compelled to account for their infringements of the plaintiff's two patents. The defendants demurred to this bill, alleging that, even admitting all the plaintiff's statements contained in his bill, he had no equitable claim against the defendants.

Mr. Bethell and Mr. J. Campbell appeared in support of the demurrers, and contended, 1stly, on the authority of the case of Perry *v.* Skinner (2 M. & W., 471), that the plaintiff had, by the disclaimer, admitted that Tayler's patent was void at the time the license was granted, and, therefore, that the agreements contained in the license were no longer binding upon them; and, 2ndly, that although the defendants had, since their partnership, acted upon the license, they were not bound by it.

Mr. Stuart, Mr. Goodeve, and Mr. Hindmarch (of the common-law bar) appeared in support of the bill. The case of Stocker *v.* Warner (1 C. B., 148), was cited, in which the Court of Common Pleas held, that a disclaimer did not necessarily admit the previous invalidity of the patent; and it was shewn, that in the case of Perry *v.* Skinner, cited by the defendants' counsel, the invalidity of the patent, prior to the entry of the disclaimer, was admitted by the plaintiff. But in this case the plaintiff had not made any such admission, and therefore, on the authority of the case of Stocker *v.* Warner, the plaintiff was entitled to assume that Tayler's patent was valid until the contrary was shewn.

With respect to the second part of the defence, it was contended for the plaintiff, that the defendants having availed themselves of the plaintiff's license, and obtained the profits arising from the working of the invention, they could not refuse to pay the license duties. It was also contended, that if the license was determined by the partnership, the defendants had been working the inventions comprised in the patents (the validity of one of which was not questioned) without the plaintiff's license, and therefore had committed infringements of the patents.

Upon the Vice-Chancellor's attention being called to that part of the bill which prayed relief against the defendants as infringing the patents, if they repudiated the license, his Honor called upon the defendants' counsel to support the demurrer, and shew how the plaintiff could be refused relief in one of the two alternative ways in which it was prayed for by the bill.

Mr. Bethell, in reply, contended, that the prayer for relief in the alternative form could not be sustained; for the prayer for relief in the one alternative could not take effect until it was decided that the other could not be granted; and it was therefore left in doubt what relief the plaintiff would seek to obtain by his bill.

The Vice-Chancellor said that the bill was framed in such a way as to raise the question, not whether the license had become void from one cause or another, but whether it was lawful for the defendants to proceed in the manner they were doing under the circumstances of the case, and also whether the contract between the plaintiff and one of the defendants bound them both. The plaintiff was willing to allow the defendants to proceed under the license, provided they would pay the duties; but if the license was not binding, and the defendants were not therefore bound to account, they were acting without the authority of the plaintiff, and against his patent rights. The bill set up a case, the justice of which was as plain as possible, namely, that whether the contract contained in the license was binding upon the defendants or not, they were not justified in doing what they had done. It was plain that they were not justified in so doing without remunerating the plaintiff, and therefore the demurrer must be overruled.

Scientific Notices.

NOTICE OF A THEORETICAL AND PRACTICAL TREATISE ON PHOTOGRAPHY.

By Dr. Guillot Saguez.—*(Being Extracts made by the Author.)*

[Translated for the London Journal of Arts.]

The object of this essay is to remedy the defects in the different methods already published, which only contain a detail of the manipulations, without in any way touching on theory; which, however, if properly explained, would be the means of enabling the operator to improve, perfect, and modify his plans, and make some progress in the photographic art.

It was in trying to satisfy himself as to some of the chemical phenomena that the author made some essential modifications in an operation already too complicated. Thus, to render paper sensitive to light, he now submits it to one or two operations, of which the first is so simple as to scarcely deserve the name of an operation; and, lastly, to fix the positive drawing or impression, the action of hyposulphite of soda has been studied, step by step; as also the effect of its double decomposition.

The theoretical ideas, which the author has expounded, are not merely speculative, but were suggested by an attentive observation of facts during three years of daily experience. The object of the author will be accomplished, if he succeeds, not in making his own conviction pass into the mind of the reader, but in inducing him to search and publish his own observations. The real progress of photographic science is only to be secured by the publication and general diffusion of the varied experiences of careful operators.

To prepare his negative paper, the author recommends the choice of a white paper of a perfectly even texture; experience having taught him, that with the same intensity of light, and the same preparation, the rapidity of the formation of the picture was in proportion to the fineness of the paper.

Another advantage obtained by this quality of the paper is, that it does not require to be waxed, an operation which always diminishes the effect of the picture.

The sheet of paper is cut about $\frac{13}{16}$ of an inch longer than the ground-glass of the camera-obscura, and is dipped, for from one to three minutes, in a solution of which the following is a formula:—

Iodide of potassium	5 grammes.
Distilled water	120

The paper must then be dried, by suspending it in the air for about twelve hours, when it will assume a rosy hue; this preparation may be made in broad daylight, and will keep several months, provided it is preserved from damp.

When a photographic picture is to be taken, a small quantity of the following liquid is to be poured on a piece of plate-glass, reserved expressly for this purpose, sufficient to slightly moisten the surface of the paper:—

Nitrate of silver	5 grammes.
Acetic acid	10 „
Distilled water	60

The action of the azotate of silver in contact with iodide of potassium forms an iodide of silver, white, solid, and easily decomposed by the action of light. The author is very particular about the proportions of the iodine and the silver. If the quantities were equal, the iodide of silver would be little or not at all sensible to light. But if, as he shews, the silver is 1, and the iodine only 0.5., the salt produced will be highly sensitive to the action of light.

For a description of the means employed to bring out and fix the negative image or picture, the reader is referred to the treatise itself. If, however, the processes there given do not differ materially from those already known, the author has so blended theory and practice as to thoroughly explain the action of each substance, and the preference given to the manipulations he mentions.

Preparation of Positive Paper.

A sheet of paper, cut to about the same size as the negative sheet, is laid for a few seconds on the surface of the following solution :—

Chloride of sodium	1 gr. 25
Distilled water	30

When the paper is well saturated, it is dried between blotting-paper; and that side of the paper which was in contact with the above-mentioned solution is now laid on the surface of a solution thus composed :—

Azotate of silver	5 grammes.
Distilled water	30

It is left on this liquid for some time; after which, it is suspended and dried in a dark room. When quite dry, it can be used, even twenty-four hours after its preparation. However carefully it may have been kept from the sun's rays, it will nevertheless assume a faint rosy tint; so that the lights in the picture will not be equal in brilliancy to the ordinary unprepared paper; for this reason, it is advisable to prepare only as many sheets as are required for the day's use.

Lastly,—follow the details for producing the positive picture, and for fixing it in a solution of

Hyposulphite of soda..........	5 grammes
Distilled water	300

This salt has a very evident action on chloride of silver, which it dissolves by the prolongation of its action. The hyposulphite of soda is decomposed, and forms sulphuret of silver insensible to light. The fire to which it is necessary to expose each positive picture, to bring it out more clearly, aids this decomposition of the hyposulphite.

A daily experience of some years has proved to the author the advantage of exposing photographic pictures to the fire; and at the same time it has confirmed his opinion of the necessity for combining theory and practice in order to advance the science of photography.—[*Comptes Rendus.*]

ON THE ART OF PRINTING IN COLORS.

BY M. JOMARD.

It was found desirable, at the beginning of the present century, on the occasion of the production of a work called "The Expedition to Egypt" (intended to contain sixty colored plates, of which a great many copies were required), to find some means, more economical and efficient than those at that time known, for reproducing colored engravings. The object desired to be effected was, to give a correct idea of Egyptian paintings, the existence of which was almost unknown in Europe at that period. Although painted in flat colors, they were found difficult to copy, on account of the beauty of the colors, and variety of their tone. It was necessary to produce exact copies to the number of about a thousand; which could not be done, on account of the imperfection of the mode of "registering," and the bad quality of the colors then used for printing. The publication was, however, begun, and a colored plate, in the first volume, was produced by printing from four plates. Another point to be attained was, to prevent the colors from running into one another at their point of junction, as that quite spoils the beauty of the picture.

It should be observed, that Egyptian paintings stand out from a uniform ground of greater or less depth of color, and that the contour of the figures is defined by an outline, which is generally red. With regard to the colors employed, they are mostly a bright deep blue, a bright red, a green, like chrome-green, yellow, white, &c.

The superintendant of the work proposed,—1st, to produce the ground-colors by means of a plate, on which fine lines only were engraved by a machine; and thus to obtain a uniform light tint,* on which to print the other portions of the design; 2ndly, by means of another plate, to print the red and blue, which were painted on the copper; and, 3rdly, to print the outline in red. He thus partially overcame the difficulty of registering, by reducing it to one printing; and, in order to do this effectually, he caused very fine registering marks to be made, and used slightly-damped paper to print on. The green was produced by laying a yellow tint over the blue by hand, which was very easily done; the white, when there was any, was obtained by leaving the ground untouched. Great care was taken in the registering, when printing from these plates; and by these simple means, five or six different colors were very expeditiously and efficiently printed; the proofs being very uniform. The defect of producing double lines was avoided, as was also the necessity of employing five or six plates to print from; the whole being completed with two plates and two operations (the production of the ground-color not being reckoned as part of the operation). With regard to the colors employed, the Government Commissioner obtained the very best that could be procured; he was, moreover, efficiently seconded by the printers of the work, M. Langlois and M. Remond.

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* Close parallel lines, printed in a light color, present to the eye the effect of a perfectly uniform tint.

So much for the printing of ordinary subjects.—For objects of another nature, such as animals, birds, plants, rocks, &c., a somewhat different method was adopted. As in subjects of natural history a close imitation of animated nature is indispensable, it would seem necessary that the hand of an artist of some talent should be employed. But who would have paid the expense of upwards of three hundred copies of pictures, of large dimensions, executed in such a style as to be fit for a great national work? For this purpose, a single engraved copper plate was used, upon which all the principal colors were first painted; after which, the secondary colors and the final touch were added in the following manner:—Two sets of mere print-colorers were set to lay on certain colors, from a pattern which was different for each set, and both very different from the finished picture. The first set only laid on the most simple colors; the second colored with a little more judgment and taste; and the finishing touch was given by an artist of some talent in the particular line required. By this means, large and fine-colored prints were obtained at a very little expense, which would otherwise have cost ten or twenty times as much, or else would not have conveyed a correct idea of the natural history of Egypt:—the same method was also adopted by Redouté, with regard to flowers.

The art of printing with several blocks is of very ancient origin. In the Royal Library there are some engravings of this kind, executed as far back as the 15th or 16th century; all of which were in flat colors. The geological map of France was also printed in those colors, at the royal press. Maps have been, for a long time past, printed in several colors in Germany and

France, either to shew the roads, canals, railways, &c., or to shew the limits of counties, or provinces, or different geological strata. Raffelsberg's map of Europe, and a hundred others, might be mentioned; but the number of colors did not exceed five, six, or seven, either in copper plate or lithographic printing. M. Koeppelin furnished a map, which is not without merit, viz., that of the environs of Paris, by M. D'Archiac. Printing from twenty-six plates, with twenty-six colors, in a perfect manner, as is the case in the royal press, is a great improvement, as it allows the most minute and varied characteristics of animals, or other objects, to be clearly shewn.

It will be understood, that the new processes are limited to uniform tints, such as geological subjects, which are purely conventional, and are not applicable to the fine arts or to the copying of paintings, properly so called.—[*Bulletin de la Société d'Encouragement.*]

REPORT ON A SYSTEM OF COUNTER-TENSION FOR PIANO-FORTES.

BY M. MONTAL.

All the different parts of a piano-forte have their importance, and ought to concur to the same end, viz., that of producing a brilliant tone, and giving durable strength to the whole fabric. It is particularly to the back of a piano-forte that the manufacturer should give his attention; for, if the frame which carries the strings be not strong enough, the instrument will be worthless, as it will not keep in tune.

The tension of the strings in an upright piano-forte is vertical between the pegs and hooking-pins in the top and bottom bars of the back frame. These cross-bars may be compared to the horizontal arms of a double gibbet, bearing unequally on the upright bars of the frame; which bars, being parallel to the strings, have a tendency, whether made of wood or metal, to bend at the middle of their length, under the continual strain of the strings. It has been tried to remedy this by bolting stout iron bars to the frame in front of the strings; but this combination does not remedy the evil entirely, and has the defect of disturbing the equi-distance of the wire-pins and keys, and thereby rendering the mechanism of the hammers more complicated.

The idea presented itself to resist the strain of the wires by producing a counter-strain by iron rods placed at the back of the frame. This principle has been applied in different ways, according to the shape of the instrument, by many makers, and according to their different views of the subject. The manner in which M. Montal has applied this principle, and perfected it in about one hundred upright pianos, of which one half are already sold, is distinguished by the following characteristics:—

The cross-bars, in which the pegs and hooking-pins of the strings are fastened, are made thicker than in the common frame, and project beyond the back of the upright bars, so as to form levers at right angles to these bars. To the overhanging part of these cross-bars (at the back of the frame) a series of straight iron rods, fitted with a swivel and screw, or screw-nut at one end, are attached, and are capable of being diminished in length by turning their respective nuts. The power obtained by this mechanical application is so great, that the rods may be made to bend back the frame in a direction opposite to the pull of the strings, and raise the instrument one or more half tones. By this means, the vertical bars are always kept straight, and are thereby enabled to exert their whole resisting power to the pull of the strings. This arrangement also prevents the warping of the sounding-board, which, in the old construction of piano-fortes, is often bent up, especially at the base part. The rigidity of a piano frame is thus secured by an application, at once simple, light, and economical; more room is also obtained behind the sounding-board, and thus the power of the instrument is increased.

The counter-strain system will be fully appreciated when it is remarked, that for want of proper means of strengthening the frame, many French, German, and Swiss makers have suffered great loss in their foreign trade, especially with North and South America, where they cannot compete with the English pianos, which, trussed with iron, are considered stronger and less liable to deteriorate from change of temperature, and are therefore better calculated to keep in tune. Such are the difficulties the French manufacturer has to overcome before he can ensure a sale for his instruments in a foreign market. The means applied and perfected by M. Montal, have been thought worthy of high commendation by the "Société d'Encouragement;" and, taking into consideration the many other improvements by this maker in upright pianos, they have awarded him a gold medal.—[*Ibid.*]

[We should be sorry to pluck the laurel from the brow of M. Montal, if the counter-tension system of piano-fortes originated with him; but, if the improvement is so great as to deserve the commendation it has received at Paris, it would be but justice to prefer the claim of Mr. Hattersley, who obtained an English patent in April, 1845, for the application to the backs of piano-fortes of a metallic elastic truss, by which the rigidity of the frame was secured;* and who, in the same year, secured the invention in France by patent, and then introduced it to the notice of the piano-forte makers in Paris. We have availed ourselves of this commendatory notice of the invention, in order to recall the attention of the trade to a simple and efficient improvement, which has been, as we believe, up to this time, altogether neglected.—[Ed. L. J.]

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* For specification of this patent, see Vol. XXVIII., p. 5, Conjoined Series.

REPORT OF AMERICAN PATENTS.

From the "Journal of the Franklin Institute."

BY MR. C. M. KELLER.

To WILLIAM GERMAR, *of Easton, Pennsylvania, for an improvement in the process of preparing tannin, for tanning leather.*

THE patentee says:—"The nature of my invention consists in fermenting the bark, by which process the tannin contained in the bark is fully extracted, and so dissolved, that it enters into a chemical connection with the fibres of the hide, without becoming crystallized."

He claims the preparation of a bark-liquor, by a process of fermentation, as herein described, to be applied to the purposes of tanning leather; using for the purpose of preparing the liquor, a ferment, and any alkali, neutral salts, or other material, that will produce the desired effect.

To EZRA L. MILLER, *of Brooklyn, New York, for an improvement in the furnace of steam-boilers, stoves, &c., for burning anthracite coal.*

THE patentee says:—"My improvement, which I designate a boiler-furnace, consists in making a new arrangement of the furnace or burner, for producing the most active combustion of the fuel, at or near the base of the fuel, and so near the grate-bars as always to insure the necessary supply of air to effect a perfect combustion; the combustible portion of the smoke and gases, liberated from the fuel, being consumed by passing through the most intense heat of the fire, in their escape from the burner, and by combining with this arrangement a reservoir or chamber for fuel, above the line of draught, of sufficient capacity to contain fuel for any desirable length of time,—which, as the combustion proceeds, settles into the base of the burner, and thus becomes self-feeding, until the fuel is consumed."

The patentee claims the peculiar manner, as fully described and set forth in the specification, of constructing the base of the fuel-chamber with an off-set or enlargement, so as to admit of taking out the smoke flues or tubes through it, or near a vertical direction at the top of the burner, and around the circumference of the fuel-chamber; and, by these means, adapting it to a furnace for boilers, as well as to stoves and hot-air furnaces.

To SAMUEL LICHTENTHAELER, *of Litiz, Pennsylvania, for an improvement in the fastenings for window-blinds and shutters.*

ON the hinged edge of the shutter there is a plate, provided with cogs, that engage with the cogs of a wheel, on the end of a spindle, that passes through the window-frame to the inside of the house; so that, by turning the spindle, the shutter is closed or opened; and on the spindle there is a helical spring, which forces a bolt into a notch in the plate at the appropriate time for fastening or holding the shutter in the required position.

The patentee claims "the principle of opening and shutting, and holding firmly, in any desired position, from the inside of the room, outside window-shutters, or blinds, by the before-described combination of the shaft, cogged wheel, spring, and cogged plate, constructed, arranged, and operated in the manner and for the purpose set forth."

To Eleazer D. Loveland, *of the City of New York, for an improvement in the hot air stove.*

This hot air furnace consists of six concentric cylinders with the fire chamber at the bottom, and in the second from the outside, the lower end of the four inner ones being above the fire. The products of combustion pass up from the fire-place between the second and third cylinders, (counting from the outside,) down between the fourth and fifth, and up to the chimney through the sixth or inner one; while the air to be heated enters at the bottom between the outer and the second cylinders, down between the third and fourth, and up between the fifth and sixth to a drum, from which it is to be conducted to the apartments to be heated.

Claim:—"Now, I do not claim, in the foregoing description of my improvement in hot air stoves, having any originality in the arrangement of the fire-plate under the hot air flues, nor the damper for governing the direct draught, they being of common use in most hot air stoves; but what I do claim, and wish to secure by letters patent, is the manner, herein described, of combining the six cylinders and flue spaces, by which a greater extent of heating surface, for the purpose herein set forth, is obtained.

To Theodore F. Strong, *of the City of New York, for an improvement in lamps.*

The patentee says:—"The nature of my invention consists in taking an ordinary glass night lamp, when in the process of making at the glass-blower's, and depressing the top, where the wick tubes are inserted, downwards, in such a manner as to elevate the sides some one or more inches above the top of the wick tubes when inserted."

Claim:—"In the construction of this lamp I do not claim the invention of any new material of which the lamp is made, nor the mode of using the socket and wick tube by inserting it into a cup of oil; but what I do claim as my invention is the peculiar form which I give to the lamp cup: that is, by depressing the top of the lamp cup where the wick tubes are inserted downwards in such a manner as to elevate the sides of the cup some one or more inches above the top of the wick tube, and thereby surrounding the flame of the lamp with a transparent shield; for, when a lamp cup is depressed in the centre in this manner, it forms a hollow rim around the sides and top of the lamp, which is intended as a protection against the numerous accidents occurring every day by oversetting of lamps and spilling the oil, or setting on fire articles coming into contact with it when overset. In this lamp, instead of the oil, when overset, running out at the vent-holes, or the top, (or the socket, should it fall out,) the oil runs into the sides, which, being large enough to hold all the oil, prevents any spilling, and at the same time surrounds the flame."

To M. W. OBENCHAIN, *of Springfield, Ohio, for an improvement in the carding engine.*

CLAIM:—"What I claim as my invention, and desire to secure by letters patent, is the employment of the additional doffing roller between the two main carding cylinders, for the purpose of taking the fibres from the first main carding cylinder and transferring them to the second, with more regularity than heretofore, as described; and in combination with this, I also claim the stripper which works between the two doffers, and which transfers the fibres from them to the second main carding cylinder, as described. And, finally, I claim the employment of two roll-doffers, with longitudinal fillet cards, arranged substantially, as herein described, whereby a much greater number of rolls can be made in the same space of time, and of better quality, than with the single doffer, in consequence of the regular action on the carding cylinder."

To R. C. HOLMES & J. J. SPRINGER, *of Cape May, New Jersey, for an improvement in the steering wheel.*

THE patentees say:—"The nature of our invention consists in the employment of two grooved rollers, mounted in appropriate bearings, one above the other, on the helm; the upper one being on the shaft of the tiller-wheel, and mounting the tiller-rope, by first attaching one end of it to one side of, and near the extremity of, the helm, passing it through a block attached to the side of the vessel, then through a block attached to the same side of the helm, then over the upper drum, and in the first groove, then under the lower drum, then around the upper drum, and in the second groove, then around the lower drum, and in the second groove, and so on to the end, each time crossing the rope, to insure the bight thereof, and then from the upper drum to a block attached to the side of the helm, and just opposite to the attachment of the rope, on the other side, and thence carrying the rope through a block at the side of the vessel, and then tying the ends to the helm, at a point just opposite to the block on the other side; so that, by this arrangement of the grooved drums, and the disposition of the tiller-rope, it (the rope) is prevented from slipping and over-riding, and, at the same time, it is prevented from making slack, as the helm vibrates, for the slack is taken up on one side as fast as it is made on the other, and the rope is also prevented from chafing."

Claim:—"What we claim as our invention is the employment of the two grooved rollers, geared together for the purpose of preventing the rope from slipping, as described, in combination with the arrangement of the tiller-rope, by having it on either side connected with the helm at two points, and also passing through a block on each side to the vessel, as herein described; whereby the making slack, by the vibration of the helm, is avoided, as described."

To ALLEN ELDRED, *of Oppenheim, New York, for a machine for digging potatoes.*

THE patentee says:—"The nature of my invention consists in the employment of a scoop, with the sides curved up, and the forward part with a point in the middle, and an oblique cutting-edge on each side, extending from the front to the top of the curved side, the scoop being provided with a standard, rising from the middle of it, to form the connection with the beam. And to this scoop is jointed a plate, with long projecting inclined fingers, or rods, on to which the potatoes and earth, dug up by the scoop, are discharged, so that the earth may drop through the spaces between the teeth or fingers, whilst the potatoes are forced up the inclined plane formed by the fingers, and are discharged above the surface of the earth, to be readily gathered. The plate from which these fingers project is connected with the scoop by means of a single bolt, on which it vibrates, by means of tappets or cones, on the faces of a wheel, to shake the earth, and facilitate the separation of the potatoes therefrom."

The claims are "the employment of the inclined fingers, in combination with the scoop, for the purpose and in the manner substantially as herein described. And also giving to the fingers a vibratory motion, the better to separate and discharge the earth."

LIST OF REGISTRATIONS EFFECTED UNDER THE ACT FOR PROTECTING NEW AND ORIGINAL DESIGNS FOR ARTICLES OF UTILITY.

1847.

Oct. 30. *H. & R. Heywood*, of Burslem, and 15, South Wharf, Paddington, for a heart-shaped drain-pipe.

30. *John Randolph Remington and William Simonett*, of Kennington, for a portable gas-water lamp.

Nov. 1. *George Chambers & Co.*, of Studley, Warwickshire, for a crotchet needle.

2. *Joseph Burdett*, of 9, Gloucester-street, Queen-square, for an expanding sofa bedstead.

2. *J. Guise*, of 75, Margaret-street, Wilmington-square, for a glass deflector for burners and lamps.

2. *John Henry Sadler*, of Brentwood, ironmonger, for a candle-guard.

2. *John and James Mc Rae*, of 17, Ave Maria-lane, City, for a portable graphite, or mechanic's companion.

3. *Richard Thomas Furness*, of 41, New Church-street, St. Marylebone, for a glass rotary ventilator.

3. *Thomas Atwood*, of Lewes, Sussex, for a singeing apparatus.

9. *Joseph Collins*, of 170 & 171, Hockley-place, Birmingham, for an India-rubber holder.

9. *Brown, Marshall & Co.*, of Birmingham, for a ventilator for railway and other carriages.

9. *Richard Sharp*, of 36, Westmoreland-street, Dublin, for a horological tell-tale.

11. *Deane, Dray, & Deane*, of 3, Arthur-street East, London Bridge, ironmongers, &c., for a farm fire-engine and liquid manure distributor.

12. *John Braham*, of Bristol, optician, for the engineer's and surveyor's trigonometer.

12. *John Greenfield*, of Broad-street, Golden-square, engineer to the Board of Ordnance, for an improved coal or cellar-plate.

13. *William Meredith & Son*, of 5, Goswell-road, for a spring for gentlemen's stocks, by which all fastenings are dispensed with.

17. *George Wright*, of 57, Long-lane, Smithfield, London, for a direction label.

18. *James Erskine*, of Newton Stewart, Scotland, gun-maker, for a heel-plate gun safety action.

19. *Charles S. Rowe*, of 9, Porteus-road, Harrow-road, for a spring skate.

19. *James Eagles*, of Walsall, for a brush.

20. *Joseph Bunnett*, of 26, Lombard-street, London, for an improved self-acting effluvia trap for sewers and drains.

20. *George Leonard Turney*, of 106, Wood-street, Cheapside, for a lady's moveable dress-fastener.

22. *William Thorowgood and Robert Besley*, of Fore-street, London, letter-founders, for Elizabethan or church text.

Nov. 23. *Charles Stocken*, of the Quadrant, Regent-street, for an envelope.

25. *John Kay*, of Ringmore, near Teignmouth, for a carriage alarum.

26. *Dunning, Cooper, & Co.*, of Wolverhampton, for a tumbler or lever for locks.

27. *John Paterson*, of 104, Wood-street, Cheapside, London, for a slide for a brace.

27. *Benjamin Lewis Vulliamy*, of 67, Pall Mall, London, clock and watch-maker, for an improved watch for travellers.

27, *Henry Jones*, of Cobridge, Staffordshire, for a self-acting ventilator.

List of Patents

That have passed the Great Seal of IRELAND, from the 17th October to the 17th November, 1847, inclusive.

To Pierre Armande le Comte de Fontainemoreau, of 4, South-street, Finsbury, London, for certain improvements in machinery for preparing cotton and other fibrous substances,—being a foreign communication.—Sealed 20th October.

Richard Archibald Brooman, of 166, Fleet-street, in the city of London, patent agent, for certain improvements in the manufacture of metals from their ores,—being a foreign communication.—Sealed 20th October.

James Webster, of Sneinton, in the county of Nottingham, engineer, for an invention of an atmospheric buffer, to be applied to railway carriages and other vehicles travelling on railways.—Sealed 20th October.

John Mollett, of Austin-Friars-passage, in the city of London, merchant, for certain improvements in fire-arms, and in cartridges,—being a foreign communication.—Sealed 20th October.

Richard Archibald Brooman, of 166, Fleet-street, in the city of London, patent agent, for certain improvements in railway turn-tables,—being a foreign communication.—Sealed 23rd October.

Joseph Woods, of Bucklersbury, in the city of London, engineer, for certain improvements in springs for supporting heavy bodies, and resisting sudden and continuous pressure,—being a foreign communication.—Sealed 26th October.

Charles De Bergue, of Arthur-street West, in the city of London, engineer, for improvements in buffing and traction apparatus, and in springs for railway and other carriages.—Sealed 1st November.

Joseph Jean Baranowski, of 3, Rue Neuve, Clichy, Paris, in the kingdom of France, Gent., for the invention of a ready-reckoning machine.—Sealed 1st November.

William Hutchison, of 3, Wakeling-terrace, in the parish of St. Mary, Islington, in the county of Middlesex, marble merchant, for improvements in processes for hardening, polishing, coloring, and rendering stone impermeable; applicable also to other substances,—being a foreign communication.—Sealed 2nd November.

Joseph Henry Tuck, of Paris, in the kingdom of France, Gent., for improvements in apparatus for ventilating buildings, carriages, chimneys, and other places where a change of air is required.—Sealed 6th November.

William Rooke, of Dudley, in the county of Worcester, engineer, for a new mode of treating and applying wrought-iron.—Sealed 13th November.

Arthur Wall, of India-row, East India-road, in the county of Middlesex, surgeon, for a new or improved apparatus for, and method of, separating oxides from their compounds and each other.—Sealed 13th November.

List of Patents

Granted for SCOTLAND, subsequent to October 22nd, 1847.

To Maximilian François Joseph Delfosse, late of Paris, but now of Regent-street, in the county of Middlesex, Esq., for certain improvements in preventing and removing incrustations in steam-boilers.—Sealed 25th October.

Charles De Bergue, of Arthur-street West, in the city of London, engineer, for improvements in buffing and traction apparatus, and in springs for railway and other carriages.—Sealed 26th October.

Richard Archibald Brooman, of Fleet-street, in the city of London, agent, for certain improvements in railway turn-tables,—being a foreign communication.—Sealed 27th October.

Richard Archibald Brooman, of Fleet-street, in the city of London, agent, for certain improvements in the manufacture of metals from their ores,—being a foreign communication.—Sealed 29th October.

Matthew Cochran, of High street, in the town of Paisley, Renfrewshire, North Britain, manufacturer, for certain improvements in the production of colored patterns or designs, or warps of carpets, velvets, or other textile materials; parts of which improvements are also applicable to the production of colored patterns or designs on woven fabrics, or other plain surfaces.—Sealed 29th October.

William Edward Newton, of the Office for Patents, 66, Chancery-lane, in the county of Middlesex, civil engineer, for improvements in machinery for the manufacture of nets and netting,—being a foreign communication.—Sealed 28th October.

Thomas Hunt Barber, of King-street, Cheapside, in the city of London, Gent., for improvements in machinery for propelling vessels,—being a foreign communication.—Sealed 29th October.

Joseph Clinton Robertson, of 166, Fleet-street, in the city of London, civil engineer, for certain improvements in the preparation and application of colors, suitable for printing stuffs, composed of silk, or wool, or of a mixture of silk and wool, —being a foreign communication.—Sealed 2nd November.

David Napier, of Glenhellish, Strachen, Argyleshire, for improvements in steam-engines and steam-vessels.—Sealed 3rd November.

Charles Ritchie, of Aberdeen, in the Shire of Aberdeen, and Kingdom of Scotland, for certain improvements in locomotive and other engines.—Sealed 5th November.

Thomas Masters, of Upper Charlotte-street, in the county of Middlesex, confectioner, for improvements in apparatus and means for cooling liquids and matters, and filtering and preventing liquids freezing.—Sealed 8th November.

Israel Kinsman, late of New York, but now of Ludgate-hill, in the city of London, merchant, for improvements in the construction of rotary engines, to be worked by steam, air, or other elastic fluid,—being a foreign communication.—Sealed 10th November.

Joseph Jean Baranowski, of Rue Neuve, Clichy, Paris, in the kingdom of France, Gent., for a ready-reckoning machine.—Sealed 18th November.

Arthur Wall, of India-row, East India-road, in the county of Middlesex, surgeon, for a new or improved apparatus for, and method of, separating oxides from their compounds and each other.—Sealed 18th November.

Alfred Vincent Newton, of the Office for Patents, 66, Chancery-lane, in the county of Middlesex, mechanical draughtsman, for improved machinery for blooming iron,—being a foreign communication.—Sealed 19th November.

New Patents

SEALED IN ENGLAND.

1847.

To Edward Evans, of the Haigh Foundry Company, Wigan, for improvements in wheels for railway and other carriages. Sealed 28th October—6 months for inrolment.

Jean Jayet, of Paris, engineer, for certain improvements in calculating machines. Sealed 28th October—6 months for inrolment.

Meyer Meyer, of Artillery-place, Finsbury, Middlesex, merchant, for certain improvements in the manufacture of umbrellas and parasols. Sealed 2nd November—6 months for inrolment.

Thomas Langton, of Bullwell, near Nottingham, frame-work knitter, for improvements in the manufacture of knitted fabrics. Sealed 2nd November—6 months for inrolment.

William Longmaid, of London, Gent., for improvements in the manufacture of alkali and chlorine. Sealed 2nd November—6 months for inrolment.

Anthony Bernhard Von Rathen, of Putney, Surrey, civil engineer, for improvements in obtaining and applying motive power. Sealed 2nd November—6 months for inrolment.

William James Walker, of Glasgow, Gent., for improvements in weaving. Sealed 2nd November—6 months for inrolment.

Thomas Dunn, of the Windsor Bridge Iron Works, near Manchester, for improvements in the manufacture of railway-wheels and axles; and in machinery and apparatus for placing carriages on to a line of rails, for removing them from one line of rails to another, and for turning them. Sealed 2nd November—6 months for inrolment.

William Boulnois, of Baker-street, Portman-square, Middlesex, Gent., for improvements in draught harness. Sealed 2nd November—6 months for inrolment.

Jean Charles Victor Coullon, of Auxerre, France, boat-builder, for improvements in propelling vessels. Sealed 2nd November—6 months for inrolment.

James Murdoch, of Staple-inn, Middlesex, for an improved capsule, or small case, for protecting matters enclosed therein from the action of the air; and an improved material to be used in the manufacture of the said capsules,—being a communication. Sealed 2nd November—6 months for inrolment.

Thomas Hancock, of Stoke Newington, Middlesex, Esq., for improvements in fabrics, elasticated by gutta-percha, or any of the varieties of caoutchouc. Sealed 2nd November—6 months for inrolment.

Charles Low, of Roseberry-place, Dalston, Middlesex, Gent., for improvements in the manufacture of zinc, copper, tin, and other metals. Sealed 4th November—6 months for inrolment.

Joshua Procter Westhead, of Manchester, manufacturer, for improvements in the manufacture or treating of India-rubber,—being a communication. Sealed 4th November—6 months for inrolment.

Jean Marie Durafour, of Lyons, France, working goldsmith, for a new fastening, or improved system of lacing without eyelet-holes. Sealed 4th November—6 months for inrolment.

John Lawson, of Paisley, North Britain, woollen shawl printer, for improvements in machinery for separating burs, seeds, and other foreign matters, from wool, cotton, and other fibrous substances,—being a communication. Sealed 4th November—6 months for inrolment.

Cyprien Marie Tessié Du Motay, of Paris, Gent., for improvements in inlaying and coating metals with various substances. Sealed 4th November—6 months for inrolment.

Richard Laming, of Clichy la Garenne, near Paris, chemist, for certain improvements in manufacturing and purifying coal gas, and in treating a residual product of such manufacture; also improvements in preparing materials to be used in the purification of coal-gas. Sealed 4th November—6 months for inrolment.

George Wells, of Penton-place, Walworth, Surrey, clerk to a railway company, for a machine for the purpose of causing communication between the guards and engine drivers of railway carriages whilst travelling on railways; and also for communication between vessels at sea and the shore; and for other similar purposes; and which invention it is intended to call, "an atmospheric signal by land or water." Sealed 4th November—6 months for inrolment.

James Pedder, of New Union-street, Middlesex, engineer, for certain improvements in steam-engines, and in propelling. Sealed 6th November—6 months for inrolment.

Robert Davison, of New Broad-street, City, civil engineer, and William Symington, of the same place, civil engineer, for improvements in the application of heat to the preparation, dessication, and preservation of bread-stuffs, confectionery, pulse, meats, vegetables, and other edible substances. Sealed 6th November—6 months for inrolment.

George Henry Bursill, of Hornsey-road, Middlesex, engineer, and Joseph Radford, of Maida-hill, Middlesex, Gent., for improvements in envelopes, wrappers, and covers; and in machinery and apparatus for the manufacture thereof. Sealed 6th November—6 months for inrolment.

John Robertson, of Tweed-Mouth, Berwick, Gent., for improvements of architecture,—the elementary method of formation employed in the same; also further applicable for harmonizing formation, as of urns or vases. Sealed 9th November—6 months for inrolment.

Henry Fielder, of Carlton Villas, Maida Vale, Middlesex, contractor, for improvements in the construction of iron beams or girders. Sealed 9th November—6 months for inrolment.

Reuben Dyer, of Boston, in the county of Lincoln, brewer, for improvements applicable to two or four-wheel carriages. Sealed 9th November—6 months for inrolment.

Edward Waud, of Bradford, Yorkshire, spinner, for certain improvements in the construction of machinery for preparing and spinning alpaca, mohair, wool, flax, and other fibrous materials. Sealed 9th November—6 months for inrolment.

George Heaton, of Birmingham, engineer, for improvements in locomotive engines. Sealed 9th November—6 months for inrolment.

Henry Krebs Claypole, of Liverpool, Gent., for certain improvements in the process, apparatus, and machinery for making sugar,—being a communication. Sealed 9th November—6 months for inrolment.

Joseph Jean Baranowski, of Rue Neuve, Clichy, Paris, Gent., for a ready-reckoning machine. Sealed 11th November—4 months for inrolment.

Israel Kinsman, late of New York, but now of Ludgate-hill, City, merchant, for improvements in the construction of rotary engines, to be worked by steam, air, or other elastic fluid,—being a communication. Sealed 11th November—6 months for inrolment.

Frederick Collier Bakewell, of Hampstead, Middlesex, Gent., for certain improvements in machinery or apparatus for making or manufacturing soda-water, and other aërated waters and liquids. Sealed 11th November—6 months for inrolment.

Samuel Salmon, of Houndsditch, Middlesex, manufacturer, for improvements in rendering certain materials applicable as a substitute for leather, paper, papier-maché, and oil-cloth, in various articles of manufacture,—being a communication. Sealed 11th November,—6 months for inrolment.

George James Seward, of Huntley-street, Bedford-square, Middlesex, for improvements in suspending window sashes, shutters, and blinds, and in the construction of the frames for the same,—being a communication. Sealed 11th November—6 months for inrolment.

Charles Blachford Mansfield, of Clare Hall, in the University of Cambridge, Esq., for an improvement in the manufacture and purification of spirituous substances and oils, applicable to the purposes of artificial light and various useful arts; and in the application thereof to such purposes, and in the construction of lamps and burners applicable to the combustion of such substances. Sealed 11th November—6 months for inrolment.

George Taylor, of No. 2, Bartholomew-place, Kentish Town, Middlesex, Gent., for certain improvements in machinery or apparatus for sweeping and cleansing chimneys, tunnels, flues, drains, and other places. Sealed November 13th—6 months for inrolment.

James Chesterman, of Sheffield, Yorkshire, machinist, for certain improvements in tape measures, and in the cases used for containing the same; and in the machinery or apparatus for manufacturing or making such measures and cases, or certain parts thereof. Sealed 13th November—6 months for inrolment.

George Price Simcox, of Kidderminster, in the county of Worcester, carpet and rug manufacturer, for improvements in the manufacture of carpets and other similar articles. Sealed November 15th—6 months for inrolment.

William Edward Newton, of the Office for Patents, 66, Chancery-lane, Middlesex, civil engineer, for improvements in the mode or modes of manufacturing or preparing certain matters to be employed as pigments,—being a communication. Sealed November 16th—6 months for inrolment.

George Phillips, of Park-street, Islington, Middlesex, for certain improvements in the purification of certain oils and spirits. Sealed November 16th—6 months for inrolment.

William Birkmyre, of Southdown, Cornwall, chemist, for improvements in smelting copper and other ores. Sealed November 16th—6 months for inrolment.

William Brunton, jun., civil engineer, of Pool, Cornwall, for certain apparatus for dressing ores or minerals. Sealed November 16th—6 months for inrolment.

Peter Armand le Comte de Fontainemoreau, of 4, South-street, Finsbury, for certain improvements in the process and machinery for making, uniting, and preserving metallic and other tubes, or pipes,—being a communication. Sealed November 18th—6 months for inrolment.

Peter Armand le Comte de Fontainemoreau, of 15, New Broad-street, City, for certain improvements in manufacturing braids, plats, fringes, gimps, and other similar articles,—being a communication. Sealed November 18th—6 months for inrolment.

William Rocke, of Dudley, Worcestershire, engineer, for a new mode of treating and applying wrought-iron. Sealed November 18th—6 months for inrolment.

Alexander Parkes, of Birmingham, experimental chemist, for improvements in the manufacture of metals, and in coating iron and steel. Sealed November 18th—6 months for inrolment.

Thomas Martin, jun., of New Cross, Deptford, in the county of Kent, machine-maker, for improvements in the manufacture of drain-tiles and tubes, and other articles, from plastic materials. Sealed November 18th—6 months for inrolment.

Thomas Walker, of Hanley, in the county of Stafford, potter, for a new and valuable mode of decorating articles of earthenware and china. Sealed November 20th—6 months for inrolment.

William Reid, of University-street, Middlesex, engineer, for certain improvements in communicating intelligence by electricity, and in the instruments and apparatus employed therein. Sealed November 23rd—6 months for inrolment.

George Philbrick Swinborne, of Pimlico, in the county of Middlesex, Gent., for certain improvements in the manufacture of gelatinous substances, and in the apparatus to be used therein. Sealed November 24th—6 months for inrolment.

Richard Coad, of Kennington, in the county of Surrey, chemist, for improvements in the combustion of fuel, and in applying the heat so obtained. Sealed November 25th—6 months for inrolment.

Pierre Philippe Celestin Barrat, of Paris, in the Kingdom of France, for improvements in machinery for tilling and working land. Sealed November 25th—6 months for inrolment.

Edwin Travis, of Oldham, Lancashire, cotton spinner, for certain improvements in looms for weaving. Sealed 25th November—6 months for inrolment.

William Hutchison, of Wakeling-terrace, Barnsbury Park, Middlesex, Gent., for improvements in treating pasteboard and other substances,—rendering them compact and impervious to wet, frost, vermin, and other destructive agents,—being a communication. Sealed 25th November—6 months for inrolment.

George Holgate, of Spring Hill, near Burnley, in the county of Lancaster, cotton spinner and manufacturer, for certain improvements in power looms. Sealed 25th November—6 months for inrolment.

Disclaimer and Amendment

OF PART OF AN INVENTION

MADE UNDER LORD BROUGHAM'S ACT.

A Disclaimer entered with the Clerk of the Patents for England on the 24th November, 1847, by Henry Le Lievre, of Cleveland-street, Mile End, in the county of Middlesex, silk dyer, to a part of the title of a patent granted to him by Her Majesty on the 24th May, 1847, for improvements in dyeing and stretching silk, *and in finishing plush*,—whereby he disclaims the words in *italics*.

CELESTIAL PHENOMENA FOR DECEMBER, 1847.

D.	H.	M.	
1			Clock after the ☉ 10m. 53s.
	—		☽ rises 0h. 50m. M.
	—		☽ passes mer. 7h. 6m.M.
	—		☽ sets 1h. 12m. A.
2	2	0	☽ in Apogee
3	5	39	♀ in conj. with the ☽ diff. of dec. 0. 46. N.
	18	51	♃'s first sat. will im.
	11	18	♂ stationary
5			Clock after the ☉ 9m. 19s.
	—		☽ rises 4h. 59m. M.
	—		☽ passes mer. 10h. 0m. M.
	—		☽ sets 2h. 54m. A.
	7	2	☿ stationary
	13	20	♃'s first sat. will im.
	18	29	☿ in conj. with the ☽ diff. of dec. 1. 3. S.
7			Pallas in Perihelion
	7	48	♃'s first sat. will im.
	8	31	Ecliptic conj. or ● new moon
	22	49	☿ greatest hel. lat. N.
10			Clock after the ☉ 7m. 7s.
	—		☽ rises 9h. 37m. M.
	—		☽ passes mer. 2h. 1m. A.
	—		☽ sets 6h. 51m. A.
10	7	38	Pellas in □ with the ☉
12	15	13	♃'s first sat will im.
13	15	46	♄ in conj. with the ☽ diff. of dec. 4. 34. S.
	19	41	♀ greatest elong. 46. 50. W.
14	4	42	☿ greatest elong. 21. 15. W.
	9	41	♃'s first sat. will im:
	13	7	♃'s second sat will im.
	16	32	Ceres in □ with the ☉
15			Clock after the sun 4m. 46s.
	—		☽ rises 0h. 20m. A.
	—		☽ passes mer. 6h. 29m. A.
	—		☽ sets Morn.
15			Mercury R. A. 16h. 4m. dec. 18. 45. S.
	—		Venus R. A. 14h. 19m. dec. 10. 56. S.
	—		Mars R. A. 1h. 56m. dec. 13.1.N.
	—		Vesta R. A. 18h. 5m. dec. 22. 44. S.
	—		Juno R. A. 20h. 23m. dec. 13. 47. S.
	—		Pallas R. A. 10h. 42m. dec. 18. 1. S.
	—		Ceres R. A. 11h. 50m. dec. 12. 47. N.
	—		Jupiter R. A. 7h. 19m. dec. 22. 19. N.
	—		Saturn R. A. 22h. 38m. dec. 10. 35. S.
15	—		Georg. R.A. 0h. 53m. dec 5. 3.N.
	—		Mercury passes mer. 22h. 26m.
	—		Venus passes mer. 20h. 45m.
	—		Mars passes mer. 8h. 21m.
	—		Jupiter passes mer. 13h. 42m.
	—		Saturn passes mer. 5h. 3m.
	—		Georg. passes mer. 7h. 18m.
	3	26	☽ in □ or first quarter
16	4	26	♅ in conj. with the ☽ diff. of dec. 0. 3. N.
	—		Occul. ε Piscium, im. 6h. 46m. em. 7h. 59m.
	9		♀ in Perihelion
17	8	22	♂ in conj. with the ☽ diff. of dec. 3. 22. N.
18	1		☽ in Perigee
19	7	7	♃'s first sat. will im.
	—		Occul. 63 Tauri, im. 17h. 27m. em. 17h. 49m.
20			Clock after the ☉ 2m. 19s.
	—		☽ rises 3h. 16m. A.
	—		☽ passes mer. 11h. 5m. A.
	—		☽ sets 5h. 52m. M.
21	10	8	Ecliptic oppo. or ○ full moon
21	11	35	♃'s first sat. will im.
	15	44	♃'s second sat. will im.
21	22	5	☉ enters Capricornus,—Winter commences
22			Occul. λ Geminorum, im. 15h. 59m. em. 17h. 3m.
22	18	8	♃ in conj. with the ☽ diff. of dec. 5. 5. N.
23	6	4	♃'s first sat. will im.
24	0	38	♅ stationary.
25			Occul. 11 Sextantes, im. 16h. 22m. em. 17h. 38m.
	—		Occul. π Leonis, im. 17h. 52m. em. 18h. 59m.
25			Clock before the sun 0m. 10s.
	—		☽ rises 8h. 25m. A.
	—		☽ passes mer. 2h. 44m. M.
	—		☽ sets 9h. 59m. M.
26	19	1	♃'s first sat. will im.
27	9	6	♃'s third sat. will im.
28	18	29	♃'s first sat. will im.
	18	21	♃'s second sat. will im.
29	1	48	☽ in □ or last quarter
29	22		☽ in Apogee
30	7	58	♃'s first sat. will im.
30	22	17	☉ in Perigee
30			Clock before the ☉ 2m. 38s.
	—		☽ rises 0h. 41m. M.
	—		☽ passes mer. 6h. 26m. M.
	—		☽ sets 0h. 3m. A.
31	10	55	☿ in the descending node

J. LEWTHWAITE, Rotherhithe.

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RECENT PATENTS.

To Henry Smith, *of the firm of H. Smith & Co., of Stamford, in the county of Lincoln, agricultural implement makers, for certain improvements in machinery for cutting and separating vegetable substances; also improvements in the construction of machines for dibbling and sowing seed, and distributing vegetable substances and manure over land; part of which improvements is applicable to wheel carriages in general.*—[Sealed 23rd March, 1847.]

This invention consists, firstly, in a novel construction of machine for cutting straw, hay, and other vegetable matters, into chaff or small pieces; secondly, in an improved machine for drilling or depositing in the ground corn or other seeds; thirdly, in a machine for dibbling and sowing seeds; fourthly, in a machine for delivering manure or compost in rows, or spreading such materials over the land; fifthly, in a machine for opening and spreading grass, in making hay; and, sixthly, in peculiar constructions of running wheels, applicable to agricultural machines and other carriages.

In Plate XVI., fig. 1, represents the improved chaff-cutting machine, in side elevation; fig. 2, is a horizontal or top view of this machine; and fig. 3, is a vertical section, taken longitudinally through the pressing and feeding parts of the machine, shewing its internal construction more perfectly than can be seen in the preceding figures. *a*, *a*, is the box or trough, in which the material to be cut is laid, and spread upon its bed uniformly; this box is fixed upon strong standards *b*, *b*, which constitute the framing of the machine. *c*, is a ribbed or fluted iron roller, which lies in an opening in the bottom of the box, and turns in fixed bearings at the under part of the box; *d*, is the pressing-roller, of iron, made smooth upon its surface, but studded with pins or points, standing radially. The ends of the axle of this roller *d*, hang in two sliding-pieces *e*, *e*, which are enabled to slide vertically on the sides of the box, and are connected together at top by a transverse-bar *f*; the bottoms of the sliding-pieces being attached by links and joints to a weighted-lever *g*, below; by means of which, the roller *d*, is pressed down upon the straw or other material, spread in the bottom of the box. From the front part of the bar *f*, a curved plate *h*, of cast iron, extends; and to the lower edge of this plate, an elastic steel presser *i*, is affixed; which presser is intended to bear upon the straw or other material in the box. This presser is formed of a bent or double plate of steel; and by its attachment to the sliders *e*, *e*, consequently rises and falls simultaneously with the roller *d*. In introducing the straw or other material to be cut, and spreading it over the bottom of the box *a*, it is necessary to raise the weighted-lever *g*, for the purpose of lifting the roller *d*, and presser *i*; the material may then be pushed forward over the ribbed-roller *c*, and the guide-roller *j*; the lever *g*, is then let fall, and the weight of the roller *d*, and the presser *i*, will bear upon the material, and hold it firmly in the box during the operation of cutting. A fly-wheel *k*, is fixed upon a lateral shaft *l*, mounted in brackets on the side of the box; and to this fly-wheel, the curved knife or knives *m*, *m*, are made fast. Rotary motion is given to this fly-wheel and its knives by a winch *n*, affixed to the end of the shaft *l*, (or the shaft may be driven by any other convenient means); and the knives passing round against the front of the box will cut or crop the projecting ends of the straw or other material as it advances. Upon the shaft *l*, a bevil-wheel *p*, slides, which is made fast in its proper position by a key; and this wheel takes into a corresponding bevil-wheel *q*, turning upon a stud set into the side of the box; and affixed to the back of this bevil-wheel is a spur-wheel, taking into a corresponding wheel on the shaft of the guide-roller *j*. A pinion *r*, keyed upon the shaft of the roller *j*, takes into a toothed-wheel *s*; and the axle of this toothed-wheel carries a pinion *t*, which is in gear with a wheel *u*, on the axle of the bed-roller *a*. The same pinion *t*, is also in gear with a coupling-wheel *o*, which takes into a similar wheel *v*, fixed on the axle of the pressing-roller *d*. Hence, it will be perceived, that by turning the winch *n*, the rotary knives will be put in motion; and that the several wheels will be driven, by which the rollers *c*, *d*, and *j*, will be made to revolve, and carry the straw or other material forward towards the edges of the knives, by which the material is cut into chaff.

In order to apply additional driving power to the machine, a second winch handle is sometimes attached, as at *w*, to the end of the shaft of the roller *j*; which handle, acting in concert with the other winch *n*, will greatly facilitate the operation.

The front part of the box is guarded by a steel mouth-piece or frame *x*, *x*, which is fitted into a recess in the cast-iron frame, forming the front of the box. This steel mouth-piece is affixed by counter-sunk screws, and is so adjusted in its position, that the cutting edges of the knives may rub against its face, and thereby be continually sharpened. In order to regulate the pressure of the knives against the steel face, the shaft *l*, is drawn up by adjustable nuts at the coupling *y*. For the purpose of suddenly stopping, in case of necessity, the rotation of the pressing-roller *d*, a lateral lever *z*, is provided, against which the attendant workman may, if need be, press his body, and thus draw the coupling-wheel *o*, out of gear with the wheel *v*, of the pressing-roller, whereby the rotation will be stopped. Should it be required to stop the rotation of the fly-wheel, that may be done by the foot of the workman pressing upon the treadle-brake lever, shewn in the under part of the machine in figs. 1, and 2.

The improved machine for drilling or depositing in the ground corn or other seeds is represented at figs. 4, and 5. Fig. 4, is a side elevation of the improved drill; and fig. 5, is a section, taken transversely through the machine. A, A, are the running wheels; B, B, is the horizontal frame, which supports the machine, and receives the shafts at its front end; C, C, are two curved brackets, fixed to, and standing vertically upon, the frame B. In the upper part of these brackets the shaft *a*, is mounted, upon which the trough or drill-box D, is suspended, and allowed to swing freely, so as to preserve its erect position at all times. The wheel A, is but imperfectly shewn in fig. 4; but it is to be understood, that the wheels turn upon axles formed by studs affixed to the sides of the horizontal frame B. The toothed-wheel *c*, is made fast upon the nave of one of the running-wheels; and, as the machine travels onward, this wheel, by its rotation, drives the toothed-wheel *d*, which, taking into the toothed-wheel *e*, above, gives rotary motion to that wheel. The wheel *e*, is made fast upon the end of a short cylindrical tube *f*, which turns on the shaft *a*; and to the reverse end of this tube *f*, a larger wheel *g*, is also made fast, which takes into, and turns a lower wheel *h*, fixed upon a spindle or shaft *i*, that passes through the drill-box, and drives the rotary cup-wheels *k*. Hence, it will be perceived, that the progress of the running-wheels gives rotary motion to the cups that feed the spouts with seed. The rotary speed of the cups *k*, will depend upon the diameters of the wheels forming the driving-train; if, therefore, a change in the speed is required, a wheel of a different diameter is placed at *d*. In order to effect this, the axle of this intermediate wheel is mounted in an adjustable socket, which slides in the curved slot of an arm *l*, attached to the side of the bracket C.

The internal construction of the trough or seed-box D, is shewn in the section, fig. 5. The seeds being put into this box will slide down the inclined plane *m*, and pass through an opening *n*, into the lower part of the box, where the revolution of the cup-wheels *k*, will cause each cup in succession to take up its quantity of seed, and deposit that seed in the delivering-spout *p*;—from thence, the seed will be conducted by the funnel *q*, into the coulter-tube *r*. These coulter-tubes (of which there are to be a series ranged across the machine, corresponding in number with the series of cup-wheels) are mounted upon a shaft *s*, *s*, which is supported by brackets *t*, *t*, attached to the under part of the frame B.

The peculiar construction of the coulter-tube consists in its being formed in two parts, connected together by a joint at *u*, by which the lower part of the coulter-tube is enabled to rise and fall, according to the inequalities of the ground over which it is drawn: consequently, as the seeds descend through the tube, they are accurately delivered into the groove or channel cut in the ground by the coulter *v*, at bottom. A weight *w*, is placed upon the arm *x*, of the coulter, for the purpose of keeping the coulter down to its work; and a small windlass, with a shaft or barrel *y*, is attached to the hinder part of the frame B, for the purpose of coiling a rope or chain, whereby the coulter may be drawn up when the machine is not in operation.

The improved dibble is shewn at figs. 6, 7, and 8; fig. 6, being a partial plan view; fig. 7, an end view, partly in section; and fig. 8, a partial longitudinal section, shewing the mode of working the dibble, and its connection with the seed-box. A, A, are the carrying-wheels, mounted on studs, which project from the sides of a strong rectangular framing B, B. To the under side of this framing, near the front end, two brackets are provided, which form the bearings for a horizontal shaft C, extending the whole width of the machine. By referring to the plan or end view, it will be seen, that two pairs of dibbles only are shewn; but it will be readily understood, that any number may be employed, either by increasing the width of the machine, or by arranging the various parts closer together. In addition to the bearings at either end, the shaft C, is further supported by arms *a*, which are bolted to the front bar of the framing, and have each a tube welded on their inner end, through which the shaft is passed, and in which it is capable of revolving; these arms *a*, are, however, intended principally to carry the frames *b*, *b*, which are formed in the manner shewn in the plan view, and are capable of rocking in their bearings,—their ends being provided with lugs, which embrace the ends of the tubes, which are attached, as before stated, to the fixed arms *a*. The object of thus securing the frames *b*, by hinge-joints, will be explained hereafter.

Attached to the under side of the frames *b*, or in one piece therewith, are the V-brackets *c*, *c*, which serve as bearings for a short shaft *d*; and also, at their lower extremities, carry sockets for the dibbles to work in. On this shaft *d*, a running-wheel D, is fixed, which supports the back end of the frame *b*; and bolted to the arms of this wheel is a cog-wheel E. The upper side of each of the frames *b*, is provided with brackets *e*, *e*, which carry a horizontal shaft *f*, parallel with, but a little on one side of, the shaft *d*; *g*, is a pinion, mounted on the shaft *f*, and in gear with the cog-wheel E; and upon the same shaft a pair of bevil-wheels *h*, are keyed. These wheels take into similar wheels *i*, the bosses of which are prolonged, and are embraced and supported by bearings *k*, connected to the inner side of the brackets *e*, *e*. The hollow of each of these bosses forms a guide for the upper end of the respective dibbles F; and they are grooved on their inner face to receive a feather-edge, with which the dibble-stems are provided. *l*, is a square shaft, supported by the frame *b*, and capable of rocking in its bearings; this shaft carries, at about the middle of its length, a bell-crank lever *m*, the ends of which are provided with bowls or rollers, and embrace a double cam-wheel *n*, (see fig. 8,) which is mounted on, and turns with, the horizontal shaft *c*. On either side of the crank-lever *m*, and attached to the same shaft, is a spring-lever *o*, one for every dibble. These levers, at their other end, clasp the dibbles between two collars or enlargements on the stem; when, therefore, an upward or downward motion is communicated to the levers, they will force down or draw up the dibbles, as the case may be;—a sufficient space being left in the boss of the wheels *i*, *i*, to allow of this vertical movement. G, G, are the seed boxes, supported by a light framing, which rises from the frames *b*, *b*. Pendant from each of these boxes is the seed-conducting pipe *p*, which terminates at the lower socket of the dibble, as shewn at fig. 8. The supply of seed from each box is regulated by a slide, which is worked by levers, connected to, and receiving their motion from, the lever *o*; and the lower end of the seed-pipe *p*, is closed when the dibble is at its lowest position. Motion is communicated to the various moving parts by the forward motion of the machine; a pair of large cog-wheels H, H, being secured to the arms of the carrying-wheels A, A, and gearing into a pair of pinions I, I, mounted on the ends of the shaft C, for the purpose of actuating the parts connected with that shaft; and the other parts of the machine being driven from the rotation of the wheels D.

The patentee thus describes the operation of the machine; it being understood that the dibbles work in pairs simultaneously, together with all the parts which have relation to their movements:—When the machine is drawn over the field to be sown in dibbled rows, the rotation of the wheel D, which rolls over the ground, causes the cog-wheel E, to drive round the pinion *g*, on the shaft *f*, and thereby give motion to the bevil-wheels *h*, *h*, on the same shaft. These wheels *h*, *h*, taking into the wheels *i*, *i*, will give a continuous rotary motion to the pair of dibbles F, by reason of the feather-edge taking into the grooves of the bosses of these wheels *i*, *i*, as before explained. The same forward motion of the machine will, through the carrying-wheels A, and the gearing H, and I, drive the shaft C, and with it the cam-wheels *n*. It was before stated, that each double cam-wheel was embraced by the ends of the bell-crank lever *m*; this is for the purpose of communicating to the lever a rocking motion, which is effected by means of two sets of tappets, arranged on the periphery of the wheel; so that, when a projection is elevating the bowl of the upper end of the lever *m*, a corresponding hollow is presented to receive the bowl of the lower end, and thus allow of the rocking of the lever. A similar motion is given to the spring-lever *o*, by reason of its being attached to the shaft *l*, which carries the lever *m*. It now being understood how the vibration of the lever *o*, is effected, it will be readily seen (by referring to fig. 6,) that when the upper end of the bell-crank lever is raised, the dibble will be pressed into the ground; and as soon as the tappet has passed the bowl of the upper end, a tappet will be presented to the lower bowl, and depress it; by which motion, the dibble will be raised instantly out of the ground. The lever *o*, is made elastic, in order to give way when any hard substance, which the dibble cannot pierce, is presented to the dibble-point. The same vibrating motion of the lever *o*, will open and close the slides of the seed box *r*, and when the dibble is raised, after having made a clean hole in the ground, its smaller diameter, or conical end, being drawn up into the socket, the opening from the seed-pipe *p*, to the socket, will no longer be covered; consequently, the seed contained in that pipe will fall into the dibbled hole. The adjoining pair of dibbles is so timed, as to come into operation when the machine has moved forward just half the distance between two dibbled holes on the same line; but as the action of these dibbles is a repetition of what has been already explained, any further description will be unnecessary.

When the machine has performed its work, the wheels D, are to be lifted off the ground, by means of a roller and chains (as shewn in the drawing), and the wheels H, will then support the whole weight of the machine. The pinions *d*, are thrown out of gear with the wheels H; and thus the machine will stop action while it is being removed.

The improved machine for delivering manure or compost in rows, or spreading such material over the land, is shewn at figs. 9, 10, and 11. Fig. 9, is a side elevation of the machine or cart containing the manure; fig. 10, is a horizontal top view; and fig. 11, a longitudinal section, taken through the middle of the machine, shewing the internal operative parts more perfectly than they could be seen in the preceding figures. A, A, is the body of the cart; B, B, the running-wheels, upon an ordinary axletree C. A trough D, is intended to hold the manure or other material to be distributed over the land as the machine moves round. This trough is capable of being raised on its joints or pivots *a*, for the purpose of discharging the material; and this may be done, or it may be placed at any angle of inclination by a bent lever *b*, (seen on the outside of the cart) which, by its depression, causes the horn *c*, to lift up the under part of the trough, and thereby to shoot the material towards the discharging-rollers. To the spokes of one of the running-wheels a circular ring of teeth *d*, *d*, *d*, is affixed, and to the other running-wheel a lesser ring of teeth *e*, *e*, is also affixed. The latter of these is for the purpose of giving rotary motion to the discharging-roller, and the former to the spreading or distributing-barrel, as the machine travels over the land. A roller *f*, having several series of teeth, or angular studs, or small knives, set round its periphery, is mounted in the bottom of the cart; the roller extending from side to side. On the end of the axle of this roller a toothed-wheel *g*, is affixed, which, by taking into the teeth of the wheel *e*, as the cart moves onward, causes the studded roller *f*, to revolve; by which means, the manure or other material, delivered from the trough D, is conducted, cut, and forced out through an aperture in the bottom of the cart, at *h*. For the purpose of more effectually breaking and discharging the manure from the roller *f*, another roller *i*, having a series of bent arms, extending from its periphery, is so placed in the vicinity of the roller *f*, that, in revolving, its bent arms pass between the studs or knives of the roller *f*, and thereby effectually clear it from any adhering matter. This roller *i*, is driven in an opposite direction to *f*, by means of a toothed-wheel *k*, on the end of its axis, taking into the wheel *g*. The bent arms of the wheel *i*, are cleared by a series of fixed scrapers, attached to the back of the cart; these scrapers serve also to prevent the manure from being thrown out at the back by the rotation of the wheel *i*. A flap or shutter *l*, within the cart, is let down occasionally to cover the arms of the roller *i*, when the manure consists of pulverized or dry material; but when the manure is moist coagulated matter, requiring separation, then the flap must be raised, to allow the full operation of both rollers. The manure, on passing through the opening *h*, in the bottom of the cart, falls upon a barrel *m*, which has several series of studs or bent arms set round it; this barrel is made to revolve by a pinion upon the end of its axle, which takes into the teeth of the large ring *d*, fixed on the running-wheel of the cart; and, by its rotation, spreads or distributes the manure in a broad sheet over the ground; but when the machine is required to deliver the manure in rows, as into furrows, the distributing-barrel *m*, is dispensed with; and, instead of it, a series of spouts or conductors are placed in the same situation as the barrel under the opening *h*, in the bottom of the cart; by means of which spouts the manure is conducted into the required channels. A section of a contrivance suited to this purpose is shewn at fig. 12, consisting of a slight box, made of thin deal, equal in length to the width of the cart. The partitions stand at considerable inclinations, so as to form hoppers or shutes, into which the manure is let fall from the discharging aperture *h*, of the cart. These shutes must, of course, be so made as to suit the distances apart at which the rows of manure are to be deposited on the land. When dry or pulverized compost is to be deposited by this machine, the wheel *g*, is thrown sideways out of gear, by means of the lever *p*; and a coupling-pinion *q*, on the lever *r*, is brought into gear with both the wheel *e*, and with a pinion *s*, on the axle of the roller *f*, behind the wheel *g*. By these means, the roller *f*, will be made to revolve in an opposite direction to that before described; and, instead of cutting the manure, will scrape it clean out of the curved conductor, and drive it through the aperture *h*, into the distributing or conducting apparatus below.

The improvements on the haymaking machine refer, firstly, to a new arrangement for supporting the bars which carry the tines or teeth; and, secondly, to the apparatus for raising the tine-wheels from the ground. Fig. 13, is a side elevation, partly in section, of the haymaker, with the improvements applied thereto. Instead of supporting the tine-bars at the centre of their length, as usual, two bosses are provided with radial arms *a*, *a*, the outer ends of each pair of which carry a bar *b*; these bars are attached, by angle-irons, to the radial arms, and are capable of swinging on the pins which pass through the angle-irons and the ends of these arms, and form a kind of hinge-joint. At each end of the bars *b*, is a forked piece *c*, with prongs or legs of different lengths; and these forks rest upon the end of springs *d*, which are provided for that purpose, and are rivetted to the radial arms. The use of the springs *d*, is to keep the bars *b*, by pressing on the forked pieces, in such a position that the tines shall be radial, or nearly so, and yet allow them to give way to any obstruction which they may meet on the ground whilst rotating. In the figure, the gearing for reversing the rotation of the tine-wheels is shewn; but, as that forms no part of the present invention, it will be unnecessary to say more than that the driving-wheels on the axles of the running-wheels are enclosed in a cylindrical case *e*, placed at each side of the machine; and that these cases form the bearings for the axle *f*, of the tine-wheels, and also for the pinions for reversing the motion; and that they also carry the axles for the running-wheels of the machine. Upon the side of the cylindrical case *e*, a lug is provided, to receive a pin, which connects an arm or lever *g*, to that case. The other end of the arm *g*, is jointed to a half worm-wheel *h*, which is keyed on a horizontal shaft, supported in bearings by the framing of the machine. Into this worm-wheel a worm *i*, mounted in bearings attached to the framing, gears; and the spindle of this worm is furnished with a handle for giving it rotary motion. It will now be understood that, in order to bring down the tines of the harrows to the ground, the worm *i*, is made to revolve, whereby the worm-wheel *h*, is moved round; the arm or lever *g*, following it in its movements. This will allow the cylindrical cases *e*, on either side of the machine, to slide round, and bring down the tine-wheels to their proper level; which position will be preserved by the worm and worm-wheel, which are made sufficiently strong to bear the indirect weight of the tine-wheels.

A modification of this part of the invention for lifting the tine-wheels is shewn at fig. 14. An arm *g*, on each side of the machine, is connected to a sliding-rack *k*, having suitable bearings on the sides of the framing, and in the teeth of each rack a small pinion *l*, gears. These pinions are keyed on a horizontal cross-shaft, which has its bearings in the framing; and they are turned by means of a winch-handle *m*. The action of this arrangement is precisely similar to that above described; but a catch or pin must be provided, to retain the handle in a given position when the tine-wheel has been raised from the ground.

The improvements in running-wheels, applicable to agricultural machines and other carriages, are shewn in figs. 15, to 21. These wheels are composed, partly of wrought-iron and partly of cast-iron; and, if required, with wooden felloes. Fig. 15, represents one of the improved wheels complete; and fig. 16, is a vertical section, taken transversely through the nave, felloe, and tire. The spokes *a*, of these wheels are made from wrought-iron elliptical tubes; and at that end of the spoke which is to fit into the nave, the tube is slightly spread out, as at *b*; the other end receives a plug *c*, which is welded into the tube. Having provided a series of these tubular spokes, as described, the inventor prepares a hoop of iron, of a semi-elliptical sectional form, or it might be slightly varied, or be made angular. This hoop, shewn at *d*, *d*, being bent or turned into a circle of the proper diameter, is rivetted to the outer ends of the several spokes, which are arranged so as to converge to a centre. The skeleton of a wheel (that is, the spokes and rim), thus prepared, is then laid flat upon a circular plate, as at fig. 17, and solid blocks of metal *e*, *e*, *e*, are placed between the spokes, so as to confine them; an outer plate is then put over these pieces, and it is screwed down tightly to the bottom plate. By these means, a mould is formed with a central recess, in which the nave of the wheel is to be cast. Suitable cores are then placed in this recess, for the purpose of forming the box or socket for the axle, and also for lightening the nave, by making parts of it hollow, as represented in the section, fig. 16. By pouring fluid metal into this central mould, the nave of the wheel is cast, and the central extremities of the spokes are all confined and firmly secured. The inner ends of the metal blocks *e*, *e*, *e*, cause the periphery of the nave to be chilled in casting, and thereby render it hard. After this wheel is removed from the mould, a wooden felloe *f*, *f*, *f*, is attached to the rim or hoop *d*, *d*, *d*; and, when that is done, a wrought-iron tire is applied, by shrinking it on in the usual way, which completes the wheel.

Another mode of constructing an iron wheel is shewn at fig. 18, and in transverse section at fig. 19. In manufacturing this wheel, straight bars of wrought-iron (as seen at fig. 20,) are prepared, with a tenon *a*, at one end of each, a fork or split *b*, at the other end, and a mortise-hole *c*, through the part shewn. These bars are bent at the part crossed by the dotted line, and their upper portions are each curved into a segment of the intended wheel, as represented at fig. 21. A circular hoop of iron *d*, of a given diameter, is then provided; and to it these bent bars are attached by rivets, in the way seen at fig. 18; the tenon *a*, at the end of each bent bar, fitting into the mortise-hole *c*, at the angle of the next bar. The skeleton of a wheel having by this means been formed, it is placed upon the flat plate (fig. 17,) with blocks between the spokes, and secured by an outer plate, as in the former instance; the nave of the wheel is then cast upon the spokes, in the way before described. To this wheel can be attached a wooden felloe and outer tire, if required; but, for light wheels, these additions may be dispensed with.

The patentee claims, as respects chaff-cutting machines, the general arrangement of the machine, as shewn in the drawings; and particularly he claims, First,—mounting the fly-wheel (which carries the knives) so that, as the knives are worn away, the fly-wheel may be brought nearer the mouth-piece. Second,—the arrangement of the gearing, and the parts connected therewith, whereby the action of the feed-rollers may be stopped, without the rotation of the fly-wheel being stopped. Third,—the peculiar arrangement of the gearing, whereby an extra winch-handle may be used for driving the machine. Fourth,—the application of a brake to the fly-wheel of chaff-cutting machines; such brake being intended to be applied when the chaff-cutters are driven by steam or horse power. Fifth,—the application of the elastic presser to chaff-cutting machines. And, Sixth,—the use of the guide-roller *j*, for conducting the material to be cut to the mouth-piece; when such guide-roller is employed in machines having their cutting knives at right angles to the progress of the material to be cut.

Under the second head of the invention, he claims, First,—conducting the seed down a rigid vibrating tube into the ground; whether such tube be applied to the side of the coulter, or form part with the coulter, as shewn in the drawing. And, Second,—the mode of suspending the seed boxes, as above described.

Under the third head of the invention, he claims, the general arrangement of dibbling-machine, as above described and shewn in the drawings; and, particularly, he claims, First,—giving a continuous rotary motion to the dibbles, whereby they will be enabled to produce clean dibbled holes, whatever be the relative speed communicated to the same, which cause the descent of the dibbles into the ground. Second,—the peculiar arrangement of the seed-pipe, whereby the fall of the grain into the earth is regulated by the vertical movements of the dibble. Third,—the application of spring-levers, for pressing the dibbles into the ground, when operated as above described. Fourth,—the arrangement of the dibbles in pairs between a running-wheel, having its bearings in a hanging frame, as above described.

Under the fourth head of the invention, he claims, the novel construction of manure depositor, as described and shewn; and, particularly, the application of the revolving barrel or cylinder to the tail of a cart, or other similar receptacle; such cylinder or barrel being intended to distribute or scatter manure over the ground; also the mode of tipping the cart, or other manure receptacle, to throw the manure on to the revolving rollers. And, likewise, the mode of changing the action of the machine, to prepare it for distributing pulverized manure, as above explained.

Under the fifth head, he claims, the particular arrangement, shewn in the drawings, for supporting the tine-bars at each end; thus rendering them less liable to be broken off while the machine is in operation; and also the modes described and shewn for raising and lowering the tine-wheels.

Under the sixth head, he claims, the modes of manufacturing wheels, as above described, with reference to the drawings.—[*Inrolled in the Petty Bag Office, September*, 1847.]

Specification drawn by Messrs. Newton & Son.

To Samuel Benjamin Edward Berger, *of Abchurch-lane, in the city of London, merchant, for an invention of certain improvements in the construction of railway carriages,—being a communication.*—[Sealed 3rd June, 1847.]

This invention relates to a mode or modes of connecting the axle-boxes of railway axles with the framing of the carriage; whereby the axles will have a slight horizontal play, sufficient for them (when travelling over curves) to take a line parallel to the radius of the curve over which they may be passing. The necessity of travelling slowly along sudden curves, or curves of small radius, to prevent the danger of running off the rails is well known; and many attempts have been made to increase the safety of such travelling; but amongst these none have been so generally or successfully adopted as the flanged wheel, the running surface of which is a frustrum of a cone. The disadvantages, however, attendant on the use of these wheels, as at present mounted (in addition to the inconvenience of having to slacken the speed of travelling, as above mentioned), are the sudden and continuous jerks transmitted to the carriages, and thence to the passengers; and the twisting and contortion, and consequent destruction, of the fibres of the iron composing the axles of the carriages; firstly, by reason of the impelling power of the engine, when passing a curve, throwing the increasing diameter of the outer wheels in contact with the rail, and the weight of the carriages acting in a contrary way, and causing the wheels to slip, until the smallest diameter of their periphery is running in contact with the rails; and, secondly, by the slip on the rail which one wheel of each pair has to make, while its fellow wheel is revolving, in order to compensate for the different distances they have to run when passing over curves.

To remedy these disadvantages, and allow the several pairs of wheels in a railway train to adjust themselves on the rails, in a manner which will compensate for the different distances the near and off wheels have to run when passing over a curve in the line of railway, the inventor connects the axles to the carriages in the manner shewn in Plate XVII., For four-wheel carriages, he employs the apparatus shewn in elevation at fig. 1, and in cross section at figs. 2, and 3,—the former being taken in the line 1, 2, and the latter in 3, 4, of fig. 1. A, A, is one of the two main side-beams of the framing of the carriage; and as each side of the carriage is similarly furnished for the support of the axles, a description of the parts pertaining to one end only of an axle will suffice to explain the nature of the invention.

a, a, are four arms or brackets, bolted, two on each side, to the beam A; and at their lower ends they are coupled together, in pairs, by a bolt or pin *b*. These pins each carry two links *c, c*; and through their ends a coupling-pin is passed, and secured in its place by rivet-heads or otherwise. *d, d,* are two rods or bars, provided at each end with eyes, for the purpose of being connected respectively at their outer ends by the coupling-pins of the links *c, c,* and at their inner ends, of being jointed together by the coupling-pins *e, e,* and intervening links *f, f,* (see the detached views, fig. 4.). These coupling-pins *e,* which are secured in their places by screw-nuts, also pass through the eyes of pendant-links *h, h,* which pass through the step or axle-box *k,* and hold it in suspension. *l,* is the bearing-spring, composed of layers of steel plates, piled one above the other, and embraced by the links *h, h,* which, when screwed tight to the axle-box by the nuts (shewn in the drawing), cause the horizontal links *f,* to bind tightly upon the middle of the steel plates, and hold them securely together. It will now be understood, that when it is desirable for the axle to take a position other than a right angle with the side of its carriage, such movement will be permitted by the links *c, c,* being free to oscillate. In order, however, to check an undue horizontal movement of the axle, and allow of its adjustment only to a line parallel with the radius of the curve over which the carriage is passing, elastic stop or check-pieces *m, m,* are provided, as shewn at fig. 1; and placed in such a manner, as to allow of a free motion of from about one quarter to half an inch; so that, whenever the axle may have a tendency to sway too much, either forward or backward, the links *c, c,* will come in contact with the pieces *m,* and be prevented from moving further. This horizontal movement of the axle (as must be obvious to every person conversant with the working of railways) will only occur when the railway deviates from a straight line; but when the carriage again pursues a straight course, the axle will regain its position at right angles to the length of the carriage.

A modification of this invention, as more particularly applicable to a six-wheel carriage, is shewn at figs. 5, 6, and 7; fig. 5, being a side elevation; fig. 6, a cross section in the line 5, 6; and fig. 7, a cross section in the line 7, 8, of fig. 5. The object of this modification is to allow the axles to move laterally, as well as in a forward and backward direction, in order that, in a carriage having three or four pairs of wheels, the hind wheels may follow the front pair, not always in a straight line, as they are now obliged to do (whereby a continuous abrasion of the flanges against the rails is caused when passing curves), but that they may take a position on the rail suitable for compensating for the difference in radius of the two sides of the curve of a railway, and permit the cone peripheries to work efficiently for that purpose. In this modification, the same or analogous parts are marked with similar letters of reference. Instead of the four arms *a*, fig. 1, forked arms *a*, are made to embrace the beam A; and at the junction of the prong, filling-pieces are provided, as shewn at fig. 7; cross rods *o*, *o*, are also employed, to ensure the rigidity required for the arms *a*. The lower ends of the arms *a*, are hook-shaped, and are intended to receive respectively the shackles or links *c*, *c*, which, together with the coupling-hooks *c**, pendant from the bars *d*, perform the same office as the links *c*, in fig. 1. From the peculiar construction of this coupling, it will be seen, that a lateral play or movement is allowed to the axle, entirely independent of the carriage-framing (no fixed point of vibration being employed, as at fig. 1,); and, consequently, the object desired, viz., giving a lateral as well as a backward and forward motion to the axle, will be obtained. In order to limit the horizontal motion of the axle, the space for oscillation is contracted at *x*, *x*, (fig. 5.) To guard against the danger which would result from the breakage of either of the shackles *c*, a block of wood *p*, is attached beneath the framing, which, in falling, will be caught by the block *p*, resting on the coupling-links *f*, of the bars *d*. *g*, is a shield for preventing the step or axle-box *k*, from getting displaced, in the event of such an accident as above alluded to.

The patentee claims the modes, herein described, of connecting the steps or axle-boxes to the framing of railway carriages, whereby the axles of such carriages are enabled to shift their positions, with respect to the frames of the carriages, for the purposes above set forth.—[*Inrolled in the Petty Bag Office, December*, 1847.]

Specification drawn by Messrs. Newton and Son.

To Joseph Wilcock, *of Barnsley, in the county of York, Gent., for certain improvements in the ventilation of mines.*—[Sealed 12th June, 1847.]

These improvements in ventilating mines consist in a mode or modes of elongating or raising the upcast shafts of mines (through which the vitiated air and gases are discharged) by means of stacks, towers, or similar buildings, erected above or in connexion with such upcast shafts; for, as the patentee states, in practice it will be found that the more the upper orifice of the upcast shaft is elevated, in comparison with that of the downcast shaft (through which the air enters the mine) the stronger will be the current of air passing through the mine, to ventilate the same.

The patentee further states, that the effectual ventilation of a mine is frequently prevented or impeded by the smallness of the upper orifice of the upcast shaft; whereas, according to his invention, not only is this orifice to be elevated, but the continuation of the upcast shaft is to be made with a transverse sectional area at least as great as that of the shaft itself; and if the continuation of the upcast shaft is intended to be used for any other purpose besides discharging the air (as, for example, to contain the apparatus employed in drawing up materials from the mine), the transverse sectional area of the continuation should be increased to such an extent as will leave a space for the escape of the air equal to the transverse sectional area of the lower portion of the shaft. The fire or fires used for causing or increasing the current of air through the mine and up the shaft, may be applied at the foot or at the top of the shaft, or in any other convenient part; but the transverse sectional area of the space allowed for the passage of the air through, over, or past the fire, must not be less than the transverse sectional area of the upcast shaft.

In some cases mines have only one shaft, which is divided by a vertical partition or partitions into two or more parts; one or more of these parts being used as a downcast shaft, and another part as an upcast shaft.

In Plate XVIII., fig. 1, is a vertical section of such a shaft, exhibiting the application of this invention thereto. *a*, is the shaft, which is divided into three portions by the vertical partitions *b*, *c*; through the central portion the materials are raised from the mine, by means of the ordinary lifting apparatus, shewn at *d*; and down one of the smaller portions or divisions *e*, the tubes, &c., for pumping out the water are introduced. The division *f*, forms the upcast shaft, and it is continued upwards, as represented, so that the upper orifice may be at a suitable height above the upper orifices of the other divisions of the shaft *a*, to produce the requisite current of air through the mine.

The patentee next describes the application of his invention to a mine worked with two or more separate shafts, where the upcast shaft is also used as a drawing-shaft. Fig. 2, is a vertical section of the upcast shaft. *a*, is the shaft, and *b*, the stack, tower, or building, forming a continuation of it; this stack contains the lifting machinery, and is therefore made with a greater transverse sectional area than the shaft, so that the escape of the air and gases may not be impeded, as before mentioned. *c*, is the framework, carrying pulleys *d*, for supporting the ropes *e*, to which are attached the vessels or carriages *f*, employed for removing materials from the mine; the ropes pass through openings in the side of the stack to the drums on which they are wound, and these openings are fitted with rollers, as shewn, to protect the rope from chafing. The vessels or carriages *f*, are removed through openings *g*, in the side of the stack, in order to discharge their contents; which openings are closed, when required, by a door *h*, suspended by a rope, passing over a pulley *i*, and provided with a counterbalance weight *j*. When it is necessary to make openings in the stack or building, the patentee considers it advisable to increase the transverse sectional area of the interior of the stack by an amount equal to the area of the mouth of each such openings, to prevent the air which enters through these openings from impeding the current of air and gases rising from the mine. If a mine has two or more shafts, which are used both as upcast and drawing shafts, the invention may be applied to each in the way above-mentioned.

The mode of applying the invention to the upcast shaft or shafts of mines which are worked with two, three, or more shafts, when such upcast shafts are not employed as drawing-shafts, is exhibited in the vertical section, fig. 3, where it will be seen that the stack or continuation of the upcast shaft is made of the same transverse sectional area as the latter; the lower part of the stack or tower being constructed in the manner shewn, so as to prevent any injurious pressure on the wall of the shaft. When a mine has three shafts, it is usual to employ one for pumping, one for drawing, and the other simply as the upcast shaft; the two former serving as downcast shafts. If more be employed, they may be either downcast or upcast shafts, according to circumstances.

The patentee states that the upper orifice of the upcast shaft should be raised to such a height above the surface of the ground as will be equal to from sixty to one hundred feet above the mouth of the downcast shaft; but he does not limit himself thereto.

The patentee claims the mode or modes of elongating the upcast shafts of mines for the better ventilating of mines, in manner above described.—[*Inrolled in the Inrolment Office, December*, 1847.]

To Sydney Smith, *of the town and county of the town of Nottingham, engineer, for a certain improved apparatus for determining the pressure of steam in boilers, and regulating the dampers of a furnace.*—[Sealed 22d May, 1847.]

This invention consists, firstly, in an apparatus for indicating the pressure of steam in a boiler (which pressure is pointed by a hand upon a circular dial-plate); and it consists, ondly, in arranging this apparatus suitably for acting on damper in the flue of a steam-boiler furnace, so as to ulate the generation of steam according to the pressure of steam in the boiler.

In Plate XVIII., fig. 1, is a vertical section of the appara- for indicating the pressure of steam in a boiler; fig. 2, is ertical section, taken at right angles to fig. 1; and fig. 3, a front view. *a*, is a pipe, communicating with the in- rior of the boiler; and *b*, is a flexible partition, which the tentee prefers to make of vulcanized India-rubber; it covers e upper end of the pipe *a*, and the outer edge of it is held curely between the flanges of the pipes *a*, *c*. The partition supports a cranked rod *d*, the upper part of which is con- cted by a strap *e*, (made, by preference, of whalebone) ith a pulley *f*, fixed on a spindle *g*; so that when the rod *d*, caused to rise, by the pressure of the steam acting on the partition *b*, the pulley *f*, and spindle *g*, will be made to turn. h^1, is a weight, fixed to the spindle *g*; and h^2, is a similar weight, mounted loosely on the spindle *g*, but which is caused to partake of the motion of the spindle as soon as the weight h^1, has moved through a space equal to about one-eighth of a revolution, by a projection on the spindle coming in contact with a pin on the side of the weight h^2, (as will be understood on referring to the detached view, fig. 4,); by which arrangement, in combination with the train of wheels between the spindle *g*, and the pointer or hand *i*, the dial-plate may be graduated equally, as shewn. On the spindle *g*, is fixed a spur-wheel *j*, which gears into a pinion *k*, upon a spindle, carrying also a spur-wheel *l*; this wheel *l*, drives a pinion *m*, fixed on a hollow axis, which turns freely on the spindle *g*, and carries, at its outer end, the pointer or hand *i*. By this arrangement, the hand *i*, will be caused to make one revolution for about every quarter of a revolution of the spindle *g*. The instrument is graduated to determine the pressure of steam up to 100 lbs. on the square inch; and the hand *i*, points to zero on the dial-plate when the weights h^1, h^2, stand perpendicularly below the spindle *g*. The weights h^1, h^2, are tin cases, into which melted lead is poured, to bring them to the proper weight: the weight h^1, contains about 2 lbs. 4 oz. of lead, and the weight h^2, about 1 lb. 6 oz. of lead; but the exact weight to be employed cannot be stated, as it will vary slightly in every instrument that may be constructed. It will therefore be necessary, in each instance, to adjust the weights by trial: this the patentee performs by subjecting the instrument to the action of steam, the pressure of which is indicated by an ordinary weighted valve; if it is found that, with steam at (say) fifteen, thirty, and fifty pounds pressure, the hand *i*, passes beyond the corresponding marks on the dial, the weight in the case h^1, is not sufficient, and must be increased; but if the hand *i*, does not come round to the proper marks, the weight is too great, and must be reduced. The patentee adjusts the weight h^2, in a similar manner for all pressures between fifty and one hundred pounds on the square inch,—the second weight only coming into action when the other has passed through about one-eighth of a revolution.

The instrument may be attached to any convenient part of the boiler; but the patentee prefers that it should be above the water-line, so that the upper part of the pipe *a*, in connection with the boiler, may be full of steam, and the bent or syphon part a^1, of the pipe be full of water; the pipe *a*, being furnished with a stop-cock, to cut off the communication with the boiler in the event of the partition *b*, giving way. *n*, is a metal partition, having a small hole through the centre of it; and *o*, is a small hole in the pipe *c*; therefore, if the partition gives way, the water will run out of the hole *o*, and thus shew that the apparatus is out of order.

Fig. 5, exhibits the mode of employing a similar apparatus to that above described for giving motion to the damper of a steam-boiler furnace. On the end of the spindle *g*, is fixed a toothed quadrant *p*, gearing into a pinion *q*; on the side of which a pin is fixed, in order that as the pinion is caused to revolve by the motion of the spindle *g*, and quadrant *p*, (resulting from an increase in the pressure of the steam within the boiler), the pin may catch hold of the hooked end of the rod *r*, connected with the damper in the flue *s*, leading from the furnace; by which means the damper will be partly or wholly closed, until the pressure of the steam is lessened. The damper is to be weighted in such a manner that it will remain open when not acted on by the rod *r*.

The patentee does not confine himself to the above details, so long as the peculiar character of his invention be retained; but he claims, First,—the so arranging apparatus that a flexible material is caused to act with suitable wheel-work, so as to determine or indicate the pressure of steam in a boiler by a pointing hand acting with a dial-plate, as above described. Secondly,—the arranging and applying similar apparatus to act upon the damper of a steam-boiler furnace, as above described.—[*Inrolled in the Inrolment Office, November,* 1847.]

To John Aitken, *of Russell-street, Bermondsey, in the county of Surrey, leather-dresser, for improvements in steam-engines, atmospheric-engines, in distilling, and in pumping water.*—[Sealed 22nd May, 1847.]

The first part of this invention embraces four improvements in steam-engines. The object of the first improvement is to obtain power in the act of supplying the condensing water to the condenser; it consists in the employment of an additional cylinder (provided with a suitable piston and piston-rod) of sufficient capacity to contain the quantity of water required to be thrown into the condenser at one time. The additional cylinder has a valve at the top, and is also furnished with suitable induction and eduction passages and valves; the induction passage communicating with a cold-water cistern, and the eduction passage with the condenser. Now, supposing the induction way to be opened by an excentric, the water will be admitted into the cylinder, and the pressure of the atmosphere will be received by the piston; as soon as the piston reaches the end of the stroke, the induction valve is closed, and the eduction valve is opened by an excentric; the water then passes from the additional cylinder into the condenser, and the piston is brought back without any resistance, leaving a vacuum behind: "thus the additional cylinder gives power to the steam-engine, in ordinary cases equal to the discharge of the air-pump, and also improves the vacuum in the condenser, by extracting air from the water on its way to the condenser."

The second improvement consists in establishing a communication between the condenser and the upper part of the air-pump by a tube with a valve in it, termed a vacuum-tube: "by which means a portion of the vapour in the condenser is conveyed to the vacuum formed by the descent of the air-pump bucket; and the vacuum in the condenser is thus improved."

The third improvement consists in the application to marine engines of what the patentee terms a "propulsion-tube," being a continuation of the discharge-pipe of the air-pump, turned downwards into the water in which the vessel floats, and bent horizontally towards the stern; so that the power hitherto employed in discharging the water from the air-pump into the atmosphere, will be directed against the water in which the vessel floats, and thus assist in the propulsion of the vessel.

The fourth improvement consists in employing the eduction steam from a non-condensing engine to work a rotary engine, which is to be placed upon the eduction-pipe of the former, or upon the chimney, if the improvement is applied to a locomotive engine.

The second part of the invention relates to a new application of atmospheric pressure in atmospheric-engines; and consists in the use of a tank containing water, in which is placed a vertical tube, less than thirty feet high, provided with openings at the bottom, and bent down at the top. To this tube a descending tube, of smaller area, is attached; and, at its lower end, it is connected with a valve-box, or side pipes, containing induction and eduction valves; these valves communicate with a cylinder, the piston-rod of which is connected with a beam or shaft, such as is commonly used in steam-engines. On the eduction-pipe four rotary tubes are placed, which are caused to revolve by the pressure exerted by the piston upon the water; and these revolving tubes return the water into the tank. At the top of the vertical tube there is an opening to receive a small tube, which projects thirty-four feet above the water in the tank, and is then bent downwards and connected with an air-pump, worked by the engine; such pump being provided to withdraw the air which would otherwise accumulate at the bend of the tube. The action of the apparatus is as follows:—"When the tubes are full of water, suppose the piston moved by external power, or a portion of water withdrawn from the descending tube, and the induction-valve opened, the water in the descending tube will fall, and the impetus or momentum of this falling water will force the piston down; and the valves being changed, the motion of the engine will be continued, as the pressure of the atmosphere will cause water to supply the place of water that has fallen; and thus there is gained by this machine the power or momentum of the falling water, and the lessened resistance of the atmosphere to its discharge, produced by centrifugal force of the revolving tubes."

The third part of the invention consists in effecting an improvement in distillation by the use of a pump. When distilling spirits, the discharge end of the worm is attached to an air-tight vessel, into which the spirit enters, and is removed therefrom by the pump. When producing gas by the destructive distillation of coal, a pump is attached to the pipe leading from the purifying apparatus to the gasometer. It is stated, that by the use of the pump the distillation is effected more quickly, the products are improved, and fuel is saved.

The last part of the invention has for its object to effect a saving in the power employed for raising water in certain cases; for this purpose the patentee employs a machine called an "equilibrium pump," which, when applied to a steam-engine, consists of a cylinder with piston and lid-suction pipe, a pipe to take back the discharged water to the level from which it originally came (in order that the same may be discharged into a river or other receptacle, at that level), a pipe to the cistern, and a pipe to the hot well,—each pipe has a valve; those on the discharge pipe, and on the pipe from the hot well, being worked by the engine, and the others being self-acting;—and which pump, when applied in such cases as a coffer-dam, is only furnished with a valve in the suction-pipe and valves on the piston or bucket. The following is the action of the pump, supposing it to be applied to raise condensing water for a steam-engine:—The steam-engine raises the piston of the pump, and the water ascends under atmospheric pressure till the piston reaches the top; the valve on the pipe leading to the hot well opens, and likewise the valve on the pipe leading to the cold-water cistern; the hot water enters the pump under the pressure of the atmosphere, and is equal to the discharge of the cold water—less the friction;—the pump is now full of hot water, the piston ascends, the valves of the pipes leading to the hot well and cold water cistern close, the valve on the discharge-pipe opens, and the water descends. Supposing the pump to be employed in a coffer-dam, the piston is raised by external power, the water rises under atmospheric pressure, and is discharged through the discharge-pipe: "thus, the power under the piston or bucket being atmospheric pressure, less the column of water, and the opposing power being the atmosphere, less the descending column of water, the only working power required is that for friction."—[*Inrolled in the Inrolment Office, November,* 1847.]

To Joseph Woods, *of Bucklersbury, in the City of London, engineer, for an invention of certain improvements in springs for supporting heavy bodies, and resisting sudden and continuous pressure,—being a communication.*—[Sealed 20th April, 1847.]

This invention of improvements in springs for supporting heavy bodies, and resisting sudden and continuous pressure, consists in forming springs of flat plates of steel, of equal breadth and thickness throughout, except at the two ends, and arranging the same in such a manner that the motion caused by pressure shall tend to deflect the plate, in reference to its breadth, instead of its thickness, as hitherto. To effect this, a plate of steel is wound round a cylindrical, square, or other shaped bar, in a spiral or volute form; after which, it is hardened and tempered, according to the ordinary process of making springs. When the spiral form is adopted, the apex and base of the spiral approach each other, when subjected to pressure; and when loaded with as much as the elasticity of the steel will allow it to resist, the spring will assume the form of a volute curve. When the volute form of spring is employed, the addition of pressure will extend the interior coils, so as to cause the spring to assume a spiral form of increasing height as the pressure is increased. To form these spiral springs, a cast-iron or other mandril, of exactly the same form and dimensions as the inside of the spring to be made, is employed; this mandril is furnished with a wrought-iron stem, a collar, and a cotter; and the plate, having its end turned or forged, so as to fit the said stem, is tightly fixed by the key and collar, and the plate of steel is hammered or rolled round the mandril while hot; it is then removed, and hardened and tempered in the usual manner. In making a volute spring, the plate is hammered or rolled round a mandril, so that the edges remain in the same place. In making a spiral spring, a portion of each end of the plate is cut away to provide a base and apex at right angles to the force applied.

In Plate XVIII., fig. 1, represents in side view, and fig. 2, in plan view, one of the improved kind of spiral springs; fig. 3, shews the mode of applying the improved spiral springs to support the weight of a railway carriage; fig. 4, represents two of these springs combined, to support a carriage; and fig. 5, represents the mode of applying them as buffer and draw-springs. Fig. 6, is a horizontal sectional view, shewing the mode of applying the volute form of springs for buffing and drawing. The carriage springs *a*, *a*, *a*, (fig. 3,) are placed between the bearing-plates *b*, *b*, and rest upon a flat plate *c*, immediately above the axle. An upper plate *d*, bolted to the bearing-plates *b*, *b*, rests upon the springs *a*, *a*; from which a pin or stud *e*, (projecting from the plate *d*,) passes, as shewn by dots in the figure. It will be seen, in figs. 5, and 6, that the draw and buffer-rods *f*, and *g*, *g*, pass through the middle of the spring, and draw or push, as the case may be, against the central part.

To obtain springs of different strengths, the breadth and thickness of the metal is varied, as is also the pitch of the curve; by which latter means, a higher or lower spiral is formed from the same plate.

The patentee claims constructing springs (for supporting heavy bodies, or resisting sudden or continuous pressure) from plates of steel, rolled or otherwise formed into volutes or spirals, and arranged in such a manner, that when pressure is applied, the plate of the spring may be deflected edgeways, or in reference to its breadth, instead of its thickness as heretofore.—[*Inrolled in the Petty Bag Office, October, 1847.*]

Specification drawn by Messrs. Newton and Son.

To JAMES RICHARDS, *of New York, United States of America, engineer, for improvements in constructing pistons.*—[Sealed 12th June, 1847.]

THIS invention consists in an improved method of constructing pistons which have metallic packing.

In Plate XVIII., fig. 1, is a plan view of the piston, with the top-plate and upper packing-ring removed; fig. 2, is a vertical section of the same, taken on the line A, B, of fig. 1; and fig. 3, is a section of the two packing-rings, detached from the piston. *a*, is the lower plate or body of the piston, fixed to the end of the piston-rod in the usual manner; and *c*, is the upper plate, secured to the lower one by bolts *d*, *d*. The edges a^1, and c^1, of these plates are bevilled, to correspond with those surfaces of the two spring packing-rings *b*, *b*, which are in contact therewith; and, as the patentee states, "it is the forming of bevils on the plates *a*, and *c*, corresponding with the bevils formed on the outer surfaces of the two packing-rings *b*, which constitutes the peculiarity of this invention." He is aware that two spring packing-rings have been used before; and he does not, therefore, claim the use of such rings generally for packing pistons, but only when their edges are formed with bevils working against bevils on the upper and lower plates of the piston. The packing-rings *b*, may be forced against the inner side of the cylinder, in which the piston works, by any of the methods heretofore adopted, when two spring packing-rings have been employed; but the patentee prefers to effect it by means of several wedges *e*, acted on by springs *f*; which wedges are suitably formed to enter between the bevilled inner surfaces of the packing-rings.

The packing-rings are made as heretofore in the form of a complete ring, and then cut, so that they become circular springs. The rings must be cut in such a manner as to prevent the steam passing into the interior of the piston: this is effected by making a vertical cut from 1, to 2, which is not so deep as the bevils a^1, and c^1, on the plates *a*, and *c*; then cutting horizontally from 2, to 3; and, lastly, making a vertical cut from 3, to 4. The surfaces produced by the horizontal cut are made to keep at all times in contact with each other; and the horizontal cuts of the two rings will be at all times covered at the back by the bevilled surfaces a^1, and c^1.

The patentee claims as his invention, combining the use of bevilled surfaces on packing-rings *b*, and the plates *a*, and *c*, as above described; and also the mode of employing a series of wedges and separate springs for forcing out the packing-rings *b*.—[*Inrolled in the Inrolment Office, December, 1847.*]

To MARIE MELANIE D'HERVILLY HAHNEMANN, *of Rue Clichy, Paris, in the kingdom of France, Doctor of Homœopathic Medicine, and* HENRY PETITPIERRE, *of Place de Chateau Rouge, Montmatre, Paris, in the kingdom of France, for improvements in instruments for writing.*—[Sealed 27th April, 1847.]

This invention consists in improvements in that description of writing instrument which contains a supply of ink within it, and is commonly termed the fountain-pen.

The patentees' improved pen is shewn in Plate XVIII., at figs. 1, 2, 3, and 4, which are fac-simile copies (on a smaller scale) of the very indifferent drawing annexed to the specification. In this document it is stated that fig. 1, is an external view of an instrument to be used for writing; fig. 2, is another view, shewing part in section; fig. 3, shews a cover, to be put on when the instrument is not required to be used; and figs. 4, and 5, shew some of the parts in detail. 1, is the cover of the upper part of the instrument, in the top of which is a recess to receive an engraved stone or seal, and in the inner part is another groove, into which is fitted an elastic plug, so that the top may be screwed on air-tight; 2, is a chamber at the upper part of the instrument; 3, is a hollow screw or cock, by turning which, air is admitted into the inner part of the instrument; 4, is the tube of the instrument, which may be made of gold, silver, porcelain, or other suitable material; 5, is a piece of copper, or other suitable material, placed at the lower end of the instrument, and acting as a stopper or cork; in the centre of this piece is a hole, and in it is inserted a screwed cock, which has a hole through its centre for the passage of ink. "6, is a screw-cock, having on its exterior four teeth, which indicate the flowing of the ink;" 7, is a small piece attached to the tube for the purpose of conveying the ink to the pen; 8, is a regulating screw, to adjust the position of the pen; 9, is a cover, to put on the pen when not in use; 10, is the pen; 11, is a lever, carrying a spring by which it is moved; "12, is a sunk-plate, which opens and shuts by means of the movement of the lever 11, and which gives passage to the ink,—this plate is fixed by a screw to the inner part of the tube;" 13, is a small flat-headed screw, placed upon the lever, 11, by which the flow of the ink may be adjusted.

To prepare the instrument for use, the cover 1, is removed, the cocks 3, and 6, are shut, and ink is introduced at the upper part of the chamber 2; when the tube 4, has received a sufficient supply of ink, the cover 1, is put on; and then the cocks 3, and 6, being opened, the ink will flow by the hole of the piece 5, along the inner part of the pen.

The patentees claim, "the mode of combining the instrument with a cover, shutting hermetically the top of the reservoir tube of ink, and with two orifices or cocks, the one placed at the upper part of the instrument for allowing atmospheric air to pass into the reservoir tube, and the other placed at the lower part of the same tube for distributing the ink to the pen."—[*Inrolled in the Inrolment Office, October*, 1847.]

To JOHN LOWE, *of Manchester, in the county of Lancaster, civil engineer, and* JAMES SIMPSON, *of the same place, joiner, for certain improvements applicable to carriages to be used upon railways; part of which improvements may also be used upon other roads.*—[Sealed 24th February, 1847.]

THIS invention consists, firstly, in a certain novel method of causing the momentum of a train of railway carriages to apply friction to the axles or wheels of each of the carriages in the said train simultaneously, or nearly so, when the speed of the engine is slackened (by the brake being applied to the tender), in order to retard or stop the progression of the carriages. The machinery, by which this is effected, allows of the friction being removed, the instant the engine starts; whereby a great saving in the wear and tear of the carriages is effected, and the frequent occurrence of accidents, and, consequently, the loss of life, which often result from neglect, injudicious application of the brakes, or other similar collateral causes, are, in a great measure, prevented. Secondly, the invention consists in an improved form of coupling-link and shackle, for connecting and disconnecting railway carriages; and, thirdly, in a certain improved form or arrangement of the springs for supporting the bodies of such carriages;—which arrangement is also applicable to carriages used upon common roads.

In Plate XVII., fig. 1, is a side elevation of the frame of a railway carriage, with the improvements shown as applied thereto; and fig. 2, is a sectional elevation, taken through about the middle of the carriage-framing. *a, a,* is the framing of the carriage; *b, b,* are the running-wheels; and *c, c,* the axles. *d, d,* is the brake-rod, extending the whole length of the carriage, and sliding in bosses or bearings *e, e, e*, e**, attached to the framing,—a hook and shackle, for connecting the carriages, is attached to each end of the said rod *d, d.* The rod *d, d,* also slides through a catch-piece *f,* the lower end of which passes through a slot in the brake-bar *g, g,* Around the rod *d, d,* are coiled two springs *h, h**, acting between the catch-piece *f,* and the bosses *e*, e**, and holding the brake-bar *g, g,* in a central position. The brake-bar *g, g,* is furnished with two brakes *i, i,* acting against two friction-cylinders *k, k,* one fixed upon each axle of the carriage, and shewn best in the longitudinal section, fig. 2. The brakes *i, i,* are supported by pins passing through the upright rods *l, l,* and working in inclined slots in the brake-bar *g, g.* The action of the brakes is as follows:—Supposing the carriage to be travelling in the direction of the large arrow, and the rod to be attached to the tender by a rigid coupling-link (hereafter described), then, as soon as the speed of the engine is slackened, or the brake is applied to the tender, the momentum of the carriage will cause the spring *h**, to force the brake-bar *g, g,* in the direction of the small arrows, and thus apply friction to the cylinders *k, k,* on the axles *c, c,* whereby the progress of the carriage will be retarded. Now, supposing the rods *d, d,* of a train of carriages to be united by rigid links to each other, it will be evident that these rods *d, d,* would act as one continuous brake-rod throughout the whole length of the train. It will also be evident, that as soon as the engine starts, the springs *h, h**, will bring the brake-bar *g, g,* into a central position, and thus remove the friction from the cylinders *k, k.*

The improved construction of coupling-link is shewn at fig. 3. *a, a,* are nuts, made fast to the links *b, b*; and *c, c,* are blocks, which slide upon the said links. The ends of a right and left-handed screw *d, d,* pass through the nuts *a, a,* and are fastened to the blocks *c, c,* by screws and washers. Thus it will be evident, that when the links *b, b,* are made to approach each other by means of the lever *e,* (which causes the screw *d,* to rotate) the blocks *c, c,* will be made to bind against the hooks, which are dropped into the links *b, b*; and when a reverse motion is given to the screw, the hooks may be withdrawn.

The improved form of shackle is shewn in side and end views at figs. 4, and 5. A rack of teeth *a, a,* is cut in the upper surface of the shackle; and an inverted rack corresponding thereto is cut in the slots of the block *b, b.* When the block is forced up against the hook, the pins *c, c,* being held by the springs *d, d,* keep the block *b,* and rack *a,* in gear, and thus prevent the block from slipping back and the carriage becoming unhooked; but when desired, the pins *e*, *e*, may be withdrawn, and the block may be raised and slidden back. The pins *e*, *e*, are for the purpose of preventing the pins *c*, *c*, from being drawn out altogether.

The improved arrangement of carriage springs is shewn in fig. 1;—the spring *m*, is suspended between the scroll-irons *n*, *n*, by the links *o*, *o*, and supported by the rods *p*, *p*, which vibrate upon a pin fixed in the axle-box. This arrangement of the springs will be found to be cheaper, lighter, and stronger than the springs now in ordinary use. Fig. 6, is a modification of the above, and may be employed for waggons carrying heavy loads.

The patentees claim, Firstly,—the method of causing the momentum of a train of railway carriages to apply friction to either the wheels, or axles, or both, of the said carriages, whenever the brake is applied on the tender, or the speed of the engine is slackened, or in any manner impeded. Secondly,—the peculiar construction of coupling-link and shackle, above described. And, Thirdly,—the improved arrangement of carriage springs, above described, and shewn in the drawings.—[*Inrolled in the Petty Bag Office, August*, 1847.]

Specification drawn by Messrs. Newton and Son.

To Francis Bernard Bekaert, *of Rue Royale Exterieure, Brussels, in the kingdom of Belgium, for a method of increasing the quantity of cream produced from milk; and preserving milk.*—[Sealed 29th May, 1847.]

This invention consists, firstly, in a method of increasing the quantity of cream produced from milk, by the addition of one table-spoonful of the liquid, hereafter described, to every two quarts of new milk; the milk is then stirred once or twice round, and left in the pan or vessel; and the skimming may take place at the expiration of the usual time, but the patentee prefers to delay it a little. He states that by the application of the liquid a much larger quantity of cream is forced to the surface of the milk than can be obtained in the ordinary way. The liquid is prepared by adding to one quart of water, one ounce of carbonate of soda, one tea-spoonful of a solution of turmeric or curcuma, and three drops of marigold water. When making large quantities of the liquid, it is not requisite to weigh the soda, as the same purpose is answered by putting such a quantity of soda into the water as will (when dissolved) on the application of a salometer, known in Belgium by the denomination of a "*pèse sel*," shew a density equal to ten degrees. The soda is first mixed with the water, and then the solution of turmeric and the marigold water are added.

The patentee claims, under this head of his invention, any salt of soda, when mixed with water, as before stated, and applied to milk, for the purpose of causing a larger quantity of cream to rise to the surface of the milk than is procured by the ordinary process. The soda and water form the basis of the improvement; the solution of turmeric and the marigold water being only used to improve the color and quality of the butter made from the cream, and not being essentially necessary to effect the increase of the cream. Although the patentee finds the use of soda most convenient, he claims any other alkali when applied in a similar way.

The second part of the invention consists in the following method of preserving milk:—One table-spoonful of a solution of soda (made by dissolving one ounce of carbonate of soda in a quart of water) is introduced into a quart bottle, nearly filled with new milk (only sufficient space having been left for the spoonful of liquid); after which, the bottle is corked, and a piece of string put round the cork to prevent it from flying; and then the bottles are put into a copper or other vessel containing cold water, which is to be gradually brought to the boiling point. When this has been effected, the fire is to be withdrawn from beneath the copper, or the vessel, if moveable, is to be taken off the fire, and the water and the contents of the bottles are allowed to get cool; the bottles are then taken out of the water and packed away.

With respect to this improvement, the patentee says, "I claim to this second part of my patent the method of applying my liquid of soda and water in the proportions above mentioned, and the putting same into the milk, and of boiling and cooling same in the manner before also described, as my invention, when applied to milk for the purpose of preserving same." But he does not confine himself to the nature or size of the bottles or other vessels, nor to the exact proportions of the ingredients above stated for either process. He claims also, under the second part of his invention, any other alkali than a salt of soda, when used in a similar manner for the preservation of milk.—[*Inrolled in the Inrolment Office, November, 1847.*]

To LEMUEL WELLMAN WRIGHT, *of Chalford, in the county of Gloucester, engineer, for certain improvements in machinery or apparatus for sweeping or cleansing chimneys, flues, and other similar purposes.*—[Sealed 4th May, 1847.]

These improvements in machinery or apparatus for sweeping or cleansing chimneys, &c., consist, firstly, in a certain novel contrivance, whereby the brushes used in cleansing or sweeping chimneys and flues are caused to collapse when ascending, and expand when descending, the said flue, by means of the elastic force of "vulcanized India-rubber;" the bristles or brushes being set, or placed, in strips, bands, or segments of this material, and applied as hereafter described. Secondly, in rendering the brushes capable of being expanded and contracted at pleasure, by means of suitable springs, formed by an application of endless bands of vulcanized India-rubber, to be worked in connection with certain arrangements of expanding and contracting levers, or apparatus. Thirdly, in expanding the body of the material in which the said brushes or bristles are set or placed, by means of inflation, or by the application of compressed air, introduced into a cylindrical or other shaped vessel, composed of vulcanized India-rubber, and capable of being so inflated that the brushes shall be thereby expanded, so that any irregularity in the space of the interior of the flue may be reached, and subjected to the action of the brushes. Fourthly, in a certain novel method of rendering the joints of the rods or tubes (to which the said brushes are attached) elastic, so as to accommodate themselves to any tortuous or irregular formation of the flue or chimney; which universal or yielding joint is also formed or made by the use or application of vulcanized India-rubber. Fifthly, in forming or rendering the tubes or rods elastic, for extending or working the brushes.

In Plate XVII., fig. 1, is a side view of an apparatus for cleansing chimneys, wherein the elastic force of the India-rubber alone is employed to expand the brush. *a*, *a*, is the rod or tube, which is made in suitable lengths, and screwed together, the joints being made elastic; or the rods or tubes themselves may be elastic, as hereafter described. Upon the rods are fixed the top and bottom plates *b*, *c*, enclosing the cylinder *d*, made of vulcanized India-rubber, in which the whalebone or other material composing the brush is fixed. *e*, is a ball, furnished with friction-rollers, to act as a guide to the brush in ascending the flue. It will be observed, that the whalebone is fixed nearer to the top of the cylinder than the bottom,—therefore it will be evident, as the brush ascends, the lower part of the cylinder will collapse, and thus allow the brush to give way; but, in descending, the reverse will be the case. The upper or smaller brush is intended to sweep the pots or chimney-tops, and the lower one to cleanse the flue.

Fig. 2, is a sectional elevation of an expanding brush, in which the vulcanized India-rubber is used in connection with certain arrangements of leverage; and fig. 3, is a similar view of the brush expanded. *a*, *a*, is the rod or tube; and *b*, *b*, are the fixed caps or guards to protect the brush. *c*, is an endless band of vulcanized India-rubber, upon which the whalebone *d*, is fixed, and which is supported by four links *e*, *e*. These links are connected by the levers *f*, *f*, to the fixed bearing *g*, and by the levers *f**, *f**, to the sliding-bush *h*; which bush is connected to the fixed bearing by two strong endless belts or bands of vulcanized India-rubber *i*, *i*. The sliding-bush *h*, is to be drawn down, as shewn in fig. 2, and held in that position by catches or other convenient means, until the brush has ascended the flue and swept the chimney-pot, when it is to be released by turning the screw-joint of the tube, which may be furnished with a small rod, and caused to release a catch; and the brush will expand and as-assume the form shewn in fig. 3, and, in descending, will thoroughly cleanse the flue.

Figs. 4, and 5, shew section and plan views of a modification of the above, in a collapsed form; and fig. 6, is an elevation of the same, expanded. The same letters of reference will apply, as in the preceding figures, excepting that the place of the links and the elastic band is supplied by the blocks of wood *c**, *c**, in which the whalebone *d*, *d*, is fixed; and *e*, is a short hard brush for sweeping the chimney-pots. The blocks *c**, *c**, upon which the back and front brushes are fixed, are made in three pieces,—the levers connected to the two outer divisions of the same turning upon ball-and-socket joints, and moving in inclined slots or mortices in the upper cap or guard *b*, so as to cause the said brushes to lengthen as they rise, and preserve the figure shewn at fig. 5.

Fig. 7, is an elevation of another arrangement of the expanding brush. *a*, is the rod or tube; and *b*, *c*, the top and bottom caps. The top cap *b*, is formed of a block of wood, having six spaces or recesses *d*, *d*, (more or less) cut or formed thereon; over which spaces or recesses are suspended levers *e*, *e*, which are prevented from falling into the said recesses by a ring of vulcanized India-rubber *f*, *f*, placed between the block *b*, and the levers *e*, *e*, and passing over the spaces *d*, *d*. Blocks of wood, carrying the whalebone or other brushes *g*, *g*, are attached to the levers *e*, *e*. Thus it will be seen, that the elastic force of the ring of vulcanized India-rubber will keep the brushes always up to their work; but when any obstruction is offered to any one or all of the said brushes, the vulcanized India-rubber will give way, and allow the levers to fall into the recesses, as shewn by the dotted line in the figure.

Fig. 8, is a side view of an apparatus for sweeping horizontal flues. *a*, is the rod or tube, the joints of which must be flexible; and *b*, is the body of the brush, the construction of which is similar to that of fig. 1. The brush *b*, is mounted upon wheels *c*, *c*, the axis *d*, of which works in an inclined slot *e*. The apparatus is also furnished with a scraper or short stiff brush *f*, which is attached to the axis by a wire.

g, g, is a flexible tube or rod (hereafter described), furnished with two balls *h, h,* for guiding the apparatus. When the apparatus enters the flue, and is forced along the same, the action of the axis in the inclined slot *e,* will raise the brush, and cause it to cleanse or sweep the top and sides of the flue; but as soon as the brush begins to return, the axis ascends the inclined slot,—thus lowering the brush *b,* and also the scraper or brush *f,* so as to remove the soot, &c., which has accumulated upon the bottom of the flue.

Fig. 9, is a section of another arrangement of brush, in which the body of the same is made entirely of vulcanized India-rubber, and which expands by the elastic force of the India-rubber alone. *a, a,* is the tube or rod, and *b, b,* are the guards or caps, the lower one being fixed to the sliding-bush *c;*—*d,* is the body of the brush, the upper part of which is fastened to the rod *a,* and the lower part to the sliding-bush *c;*—*e, e,* are two rings or bands of vulcanized India-rubber, in which the whalebone or other brushes are fixed. When this apparatus is to be used, the sliding-bush *c,* must be drawn down, which will cause the body of the brush to elongate, and consequently to decrease in diameter; the tube must then be held in this position by catches or otherwise; and when the brush has reached the top of the flue, the catches must be released, and the brush will assume the form shewn in the drawing. Fig. 10, is a section of a brush, the body of which is also composed entirely of vulcanized India-rubber, and is capable of being expanded by compressed air. *a, a,* is the tube, and *b, b,* are the caps or guards; *c,* is a hollow vessel of vulcanized India-rubber, secured by nuts between the caps *b, b,* and formed perfectly air-tight; *d,* is a loose band or cylinder of the same material, upon which the brush is fixed; and *e,* is a universal revolving guide-ball, which may be used with this or any of the above-described brushes. The apparatus is to be passed up the chimney or flue in a collapsed state, and the chimney-pot cleansed. Air is then to be forced into the body of the apparatus up the tube *a,* (which is perforated at that part inside the vessel *c,*) by means of an air-pump, whereby the brush will be expanded to the required degree; when the brush may be drawn down to cleanse the flue. Fig. 11, is a modification of the above,—the body of the brush is formed of a double cylinder of vulcanized India-rubber *a, a,* bound tightly by means of wires over two grooved pulleys *b, b*; the brush being fixed to the outer cylinder. It is almost needless to state that these two arrangements must be provided with valves, opening upwards; and also with a valve, closed by a spring, for regulating the pressure of the air when inflated.

The mode of making flexible joints in the rods or valves of such machinery or apparatus is shewn at fig. 10; the ends of the rods or tubes are brought together, and a tube of vulcanized India-rubber is placed over the joint; the ends of this elastic tube are then bound round tightly with string or wire. Or a solid piece or rod of vulcanized India-rubber may be placed and secured inside the tubes, so as to form a universal flexible joint.

The method of making the rods or tubes themselves elastic or flexible is as follows:—These elastic rods (to be used for the upper joints of this apparatus) are to be formed by combining a series or bundle of small thin pieces of whalebone, with an outside casing or integument of vulcanized India-rubber; so that, when thus combined, they shall constitute a flexible rod, which will answer the purpose required.—[*Inrolled in the Petty Bag Office, November,* 1847.]

Specification drawn by Messrs. Newton and Son.

To WILLIAM VICKERS, *of Sheffield, steel manufacturer, for improvements in the manufacture of iron.*—[Sealed 19th June, 1847.]

THIS invention relates to the manufacture of malleable or wrought iron, and consists in melting pig iron with wrought iron, running the melted mixture (when divided into small streams) into water, and employing the product for making malleable iron by the ordinary process.

In carrying out the invention, the patentee melts pig iron with iron turnings or scraps of wrought iron in any suitable furnace, such as an ordinary cupola furnace. The proportions will vary; but the patentee has found that the addition of a very small quantity of wrought iron to the pig iron will materially improve the quality of the wrought iron afterwards produced. He has commonly employed about thirty parts of wrought iron turnings or scrap to seventy parts, by weight, of pig iron; but if the iron be intended for making steel, the proportion of wrought iron may be increased with advantage; and the patentee has used as much as forty per cent. of wrought iron; he has also used a less proportion than thirty per cent., when making wrought iron for general purposes. When the mixture has been melted, it must be divided into very fine streams, and allowed to drop into water. This may be done by tapping the furnace into a strong cast-iron tray, perforated with holes about half an inch in diameter, and lined with a sand composition, such as is used for stopping cupola furnaces; this lining, which is about half an inch thick, is pierced with holes about a quarter of an inch in diameter at those places where there are holes in the tray; and the tray is placed about fifteen feet above the level of the water, contained in a wooden tank about four feet deep. The iron, after falling into the tank, will be found to be in a divided state, and is to be treated in the same manner for making wrought iron as when pig or refined iron is used for that purpose.

The patentee states that he has sometimes used from three to five per cent. of the black oxide of manganese, when melting the mixture of pig iron and wrought iron; small quantities being placed from time to time in the twyer holes, and driven into the furnace by the blast.

The patentee claims the melting pig iron with wrought iron scraps or turnings, and running the same into water, and using the product in the manufacture of wrought or malleable iron.—[*Inrolled in the Inrolment Office, December,* 1847.]

To HENRY LE LIEVRE, *of Cleveland-street, Mile-End-road, in the county of Middlesex, silk dyer, for improvements in dyeing and stretching silk, and in finishing plush.*—[Sealed 24th May, 1847.*]

THIS invention relates, firstly, to dyeing silks the color of what is termed "hat-black;" and, secondly, to the process of stretching silks so dyed.

In dyeing hat-black it has been usual to employ nitrate of iron, as a mordant, and oak-bark; but the patentee has found that by substituting alder-bark for oak-bark a great improvement in the color is obtained; this part of the process is, in other respects, the same as usual. In the next part of the process fustic has been employed; but the patentee states, that a great improvement will be effected by using equal quantities of fustic and citron-bark. Lastly, it has been usual in dyeing silks hat-black, to employ a lather of mottled soap and logwood; now the patentee proposes to substitute olive-oil soap for the common soap.

The improvement in stretching silk, so dyed, consists in performing the process in an atmosphere of steam, instead of effecting it in the ordinary atmosphere. For this purpose, the patentee places a perforated tube close under where the process of stretching is being performed, and admits steam from a boiler into it, so that the steam will rush out through the perforations and produce an atmosphere of vapour, which will greatly improve the appearance of the silk stretched under such circumstances.

The patentee claims, First,—the mode of dyeing silk hat-black, by employing alder-bark, citron-bark, and olive-oil soap. Secondly,—conducting the process of stretching dyed silk in an atmosphere of vapour or steam, as described.—[*Inrolled in the Inrolment Office, November,* 1847.]

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* By a disclaimer, dated November 24, 1847, the patentee has struck out the words "and in finishing plush" from the title of his patent, so that it now reads "improvements in dyeing and stretching silk."

To Alfred Vincent Newton, *of the Office for Patents, 66, Chancery-lane, in the county of Middlesex, mechanical draughtsman, for improved apparatus to be applied to steam-boilers,—being a communication.*—[Sealed 15th April, 1847.]

This invention relates to a novel mode of constructing an apparatus for ascertaining and indicating the height of water in a steam-boiler. The principle upon which the instrument or apparatus is constructed, is that of a percussive horizontal action of a flat surface upon a portion of the water the height of which is to be gauged. One form of apparatus constructed on this principle, and which has been found fully to answer the intended purpose, is shewn in Plate XVIII.; fig. 1, being a side or external elevation of the apparatus attached to a steam-boiler; and fig. 2, a vertical section, taken through the same, for the purpose of shewing the internal construction. *a, a,* represents a portion of an ordinary steam-boiler; and *b, b,* is a small cylinder bolted thereto, and communicating therewith by means of two short tubes or passages *c,* and *d*; the upper one of which communicates with the steam-space of the boiler, and the lower with that part which contains the water. *e,* is a small metallic or other piston, which moves freely in the cylinder *b, b,* and is connected by a rod *f,* to a vibrating arm or lever *g,* above, which is enclosed in a quadrant-shaped chamber, that forms or is fixed on the top part of the small cylinder *b, b.* The pivot or axle of the arm or lever *g,* passes through a stuffing-box *j,* made at the small end of the quadrant, and carries externally (as seen in the side elevation, fig. 1,) another arm or lever *h,* which is furnished with an index or pointer, for indicating, on a graduated scale, the height of water in the cylinder, and, consequently, in the boiler. A rod or handle *i,* is also suspended from the arm or lever *h,* for the purpose of enabling the attendant to raise the piston or plunger *e,* in the cylinder, and bring it down with percussive force on to the surface of the water, in order to ascertain its exact height. It will be at once understood, that the same pressure of steam and water must exist in the cylinder and its quadrant case as in he boiler, and that the working of the apparatus cannot be ffected thereby. The patentee states, that it is advisable to ake one or two small apertures in the plunger, in order to llow the water and steam to pass through when it is raised. e further states, that the plan, above described, is one form f the improved instrument or apparatus, which has been und to answer in practice; but he does not confine himself hereto, as the apparatus may be considerably varied without eparting from the nature and object of the invention: for stance, instead of connecting the piston or plunger to a ibrating arm *g*, it may be attached to a vertical arm, which, y being furnished with an index or pointer, may be made to ndicate the height of the water in the cylinder.

The patentee claims the construction of a gauge or indicator, for ascertaining the height of water in steam or other boilers, by means of a plunger or piston, connected to a rod or arm, in such a manner, that when brought down suddenly on to the surface of the water to be gauged, the percussive force of the plunger or piston, striking the water horizontally, will indicate the level thereof.—[*Inrolled in the Petty Bag Office, October,* 1847.]

Specification drawn by Messrs. Newton and Son.

To BONDY AZULAY, *of Rotherhithe, in the county of Surrey, printer, and* ABRAHAM SOLOMONS, *of the city of London, merchant, for certain improvements in the manufacture of charcoal and other fuel.*—[Sealed 10th June, 1847.]

THIS invention relates, firstly, to the manufacture of charcoal. In the ordinary method of manufacturing charcoal there is always considerable waste, caused by the breakage of the charcoal. The patentee reduces the waste portions, if necessary, to a finer state of powder; and then compresses the same, by an hydraulic press or other apparatus, in moulds, until the mass is reduced to from one-fifth to one-eighth of of its original bulk. The block of fuel, when taken out of the mould, will be hard and solid, and, in a given size, will contain more combustible matter than can be found in an ordinary specimen of charcoal: for this reason, the patentee considers that it will be a very useful fuel for steam-vessels and locomotive engines, saving room in the bunkers and tenders.

The second part of the invention consists in manufacturing fuel of small coal, breeze, coke, and cinders, with or without charcoal, by pulverizing the whole, if necessary, and then compressing the powder into blocks of a suitable size.

The third part of the invention consists in the manufacture of a fuel adapted for lighting fires. The patentees mix charcoal powder, small coal, breeze, coke, and cinders (all or any of them) with tar, pitch, resin, or other suitable inflammable substance, and compress the mixture in moulds; when taken from the mould, the block is dipped in tar, pitch, resin, or other suitable inflammable substance; and it may then be covered with saw-dust and wrapped in waste paper: a block so prepared will readily ignite on the application of a lighted match.

The patentees claim, Firstly,—the manufacture of solid blocks of charcoal from thė small pieces or dust produced in the ordinary mode of making charcoal. Secondly,—the manufacture of a fuel by compressing charcoal dust mixed with small coal, coke dust, cinders, and breeze, or with one or any number of the above-named substances. Thirdly,—the combining a fire-lighter with fuel in the manner above described.—[*Inrolled in the Inrolment Office, December,* 1847.]

To WILLIAM KIRRAGE, *of Warner-place, Hackney-road, in the county of Middlesex, builder, for an improved combination of materials for building purposes, and a new application of certain materials for building purposes.*—[Sealed 22nd October, 1847.]

THE first part of this invention relates to the preparation of asphalte. To 5 cwt. of bitumen, while melting, the patentee adds 1 lb. of sal-ammoniac; after which he introduces three bushels of ground blue lias or Dorking lime (the blue lias being preferred); and then he adds to the boiling mass as much clean sharp grit as can be stirred in. If it is likely that the asphalte will be much exposed to heat, 3½ lbs. of sulphur and the same quantity of common resin should be added, which will enable the mixture to bear an additional heat of 20°. The novelty of this mode of preparing asphalte consists in adding the sal-ammoniac to the hot bitumen, which causes it to expand, and thereby admit of much more lime and grit being added than would otherwise be possible: the additional quantity of lime enables the asphalte, when set, to bear a greater degree of heat; and the additional quantity of grit imparts firmness and strength to the asphalte.

This invention relates, secondly, to the preparation of concrete. Six parts of clean sifted shingle and one part of the best blue lias ground lime are mixed with water wherein sal-ammoniac has been dissolved (in the proportion of ½ lb. of sal-ammoniac to one gallon of water), and which must be heated to 120° Fahr. The novelty of this process consists in mixing the materials with water in which sal-ammoniac has been dissolved; whereby the concrete will be caused to set more quickly. Care must be taken that the water is used at a temperature of 120°; for if added at a much higher temperature, it would destroy the lime; and if at a much lower temperature, the sal-ammoniac would not act on the lime.

The third part of the invention consists in forming blocks, to be employed for building purposes, of a combination of the improved asphalte with brick or other rubbish. Asphalte, prepared as described under the first improvement, is mixed with rubbish, that is, broken bricks or stones, in equal proportions, and the whole worked into a semi-fluid mass, which can be moulded into blocks of any required form. The asphalte could be formed into blocks alone; but the combination of the rubbish therewith gives additional strength, and diminishes the cost of the blocks without rendering them in the least degree porous or liable to decay.

The last part of the invention consists in the application of asphalte for coating the whole or only the outer surface of blocks of concrete or porous stone for building purposes. The block is placed in a rough frame, which projects beyond the face or side of the block to an extent corresponding with the intended thickness of the coating of asphalte; the asphalte is then laid on, smoothed with a trowel, and "hand floated" with fine sand. The remaining sides may now be treated in a similar manner, if desired.

The patentee claims, Firstly,—the use of sal-ammoniac in the manufacture of asphalte. Secondly,—the use of sal-ammoniac in the manufacture of concrete. Thirdly,—the making of building blocks of the improved asphalte mixed with brick or other rubbish. Fourthly,—the application of the improved or other asphalte to coating or facing blocks of the improved or other concrete or blocks of porous stone, or the outside surfaces thereof, for building purposes.—[*Inrolled in the Inrolment Office, December,* 1847.]

Scientific Adjudication.

IN THE COURT OF EXCHEQUER.

BETWEEN

HARLEY BARBER, PLAINTIFF, AND HENRY GRACE, DEFENDANT.

This was an action brought, under the direction of the Court of Chancery, by the plaintiff, as assignee of a patent granted to one William Bates, on the 8th day of March, 1836, for "improvements in the process of finishing hosiery and other goods manufactured from lambs' wool, Angola, and worsted yarns."

The defendant pleaded that he was not guilty of infringing the patent; and also disputed the novelty of the invention,—the said William Bates being the first inventor; and he also questioned the goodness of the specification.*

The case was tried before the Chief Baron and a special jury, at Guildhall, in July, 1847. The plaintiff having opened his case and called several witnesses, it appeared that the defendant had used rollers, heated by steam, to finish hosiery goods, and that this was the infringement complained of by the plaintiff.

The Chief Baron interfered, and intimated his opinion that "heated rollers" were not within the patent, which was for "hot boxes," pressing by a dead or continuous pressure.

The plaintiff's counsel contended against this for some time, but the jury concurred with his lordship; and his lordship then said, the only question was, whether what the defendant had done was a colorable imitation or evasion of the patent?

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* For copy of this specification, see Vol. XIV., page 210, Conjoined Series.

The jury immediately found that it was not so, and their verdict on that issue was recorded.

The defendant, on the issue of not guilty having been found for him, did not offer any evidence on the other points, and, consequently, the verdict on them passed, as a matter of form, for the plaintiff.

In Easter Term, 1847, the plaintiff obtained a rule *nisi* for a new trial, which came on to be argued on the 25th day of November, 1847, when the Judges delivered the following judgment:—

JUDGMENT.

Chief Baron Pollock.—I am of opinion that this rule ought to be discharged. I think the real question before us is, what is the meaning of the specification, and does it include the case of pressure by cylinders? The specification is to be judged of entirely by itself. I do not think the fact that I am about to advert to ought to govern the decision of the Court at all; but it is difficult not to perceive, that the parties themselves did not intend to include cylinders,—for cylinders were certainly not used by the inventor; they are not only not mentioned in the specification, but they were never dreamt of, and never used at all until two or three years after the patent was actually in use. I do not mean that at all to govern the matter, because, if they had used cylinders immediately, the construction of the patent certainly ought to be the same. It is difficult not to believe that this was a discovery upon a discovery,—that the use of the cylinder was adopted after the boxes had been made the subject of a patent, and had been used for a few years; but certainly the effect of our holding that cylinders were within the patent would be this,—that if the party could have kept his process a secret, in point of fact, and given the public nothing but what the specification would afford them, he would have had the exclusive use, under the protection of the law, for fourteen years, of the cylinders; and at the end of those fourteen years the public would have been wholly ignorant that cylinders were capable of being used, and had been used, and were the object of the patent; but the question is, whether the manner in which this is stated in the specification leads to the conclusion that a cylinder is included either in words or was contemplated by the parties. Now, the specification, I observe, follows the commonly reserved mode of drawing specifications; that is, to state in some general language what is the object of it, and really to point attention to the subject, by which the party is very little bound, and perhaps, in most instances, not at all; and in that to give as little information upon the subject as possible;—and then the specification goes at once to the description of the machinery, and alleges that to be an invention, consisting of submitting hosiery to the finishing process of a press. The specification proceeds to describe the machine, and then describes the process of applying hot boxes, and then speaks of causing the boxes to press for some minutes, and three minutes will generally be found sufficient; and then, having thus described the nature of the invention, it proceeds to observe, "I am aware that cloth, made of wool, but woven with warp and weft, has been heretofore pressed by boxes or surfaces heated by steam or water." The learned counsel for the plaintiff contends, that the expression "boxes or surfaces" means "boxes" or *any* surfaces.—I very much doubt that;—I think "boxes or surfaces" was an expression used for the purpose of meaning that they are aware it is the surface and not the box; that is, the operative part, to guard against an objection, that it is not the box, which in one sense it is not,—it is only that part of the box which is superficial that produces any effect; and, therefore, they say, "by boxes or surfaces," and that "I do not, therefore, claim the finishing of such goods by heat generally, but what I do claim is, the submitting hosiery and similar goods, made of elastic stocking fabric, to the pressure of hot boxes or surfaces, heated by steam, water, or other fluid, as above described." Now, looking at the description which is before me, you see a machine, composed of parts that certainly do not suggest to you, in the remotest degree, that a cylinder is capable of being used; the figure exhibits an hydraulic press, pressing upwards, so as to make meet the two boxes, in which are to be inserted steam or hot water, and the subject matter to be pressed is to be placed between them; and (as I think my brother Alderson some time ago pointed out) that the object of the patent manifestly is to subject to continuous pressure, and not to variable pressure,—that it is the surface that is not to vary, which is the case in the cylinder. The substance of this is not so much in writing as it is in the print or drawing before us. Does that include a cylinder?—[holding up the drawing.] There is no doubt in one sense a cylinder is a box, but is it in the sense in which the word box is used here, either connected with the word *surface*, and especially connected with the print that is illustrative of that description given in the specification itself. It appears to me that a cylinder is not included in the specification, but it is not therefore a matter which necessarily all the world might use, by any means; it might have been, and it may be, that the cylinder is a matter so obvious, either from the construction of the apparatus, from the description given, or from the well known state of trade,—it might have been, that the use of a cylinder in place of these boxes was so obvious, and so clearly a mere equivalent, and therefore a mere evasion,—that the jury might have been justified in coming to a conclusion, that this patent had been infringed,—that was a question proper for the jury to find; and they have found, that it was not a colorable evasion. I own I am perfectly satisfied with that verdict. My impression is, that the party who framed this specification, or the party who invented the subject matter of it, neither the one nor the other ever dreamt at all of using a cylinder, or insinuating a cylinder, or claiming the use of a cylinder in the course of the proceedings prior to the patent being taken out. Under these circumstances, I think the construction put upon the patent was correct, and that the jury came to a just conclusion; and that there is no foundation for a new trial; and the rule must be discharged.

Mr. Baron Parke,—I agree entirely with the Lord Chief Baron in this case. If the question now to be decided by us was, whether, if the construction put on the specification by the learned counsel for the plaintiff was correct, this would be a good patent—I should wish to consider a little about it. I should not feel myself bound to give any opinion on that question at present. What they contend is, according to the true meaning of the specification, the plaintiff claims every mode of applying heated surfaces by means of steam or hot water or hot liquid, to suit fabrics which had been previously applied to woven fabrics—it may be a question whether a patent would be good for that. I do not mean to give any opinion upon that question at all, for I think, according to the true construction of this specification, which belongs to the court, and reading it now fairly, it is evident that the plaintiff in this patent claims, not that of applying to every species of surface, but that it is a patent for a particular machine, which is described in the specification. The specification begins by stating "that the invention consists in submitting hosiery and similar goods, made of elastic stocking fabric, and known by the name of lambs' wool, worsted, and Angola, to the finishing process of a press" (that is, of an instrument which presses the article); and that press is to be "heated by steam, hot water, or other fluid, in the manner hereinafter mentioned," with a particular description of the machine. It then states, that the consequence of that is, that the surface is laid smooth, and the color brightened, and a far superior finish is given than by any other process that could be given to goods of the same description; then he proceeds to describe very particularly the nature of the machine, which is a sort of square box, which shews the surface on which the goods are placed; and then there is another box, filled with steam, which is pressed upwards by means of an hydraulic press or by any other similar means; and then it goes on to say, "this is the description of press I prefer for the purpose of my invention." He does not confine himself to any particular mode. Then he remarks, instead of the pressure being obtained by an hydraulic press, it may be obtained by any other mode in which the surfaces are pressed together with the goods between them; that is the description solely of the press contained in two different boxes; then he describes the mode in which the stockings are applied to those boxes; and then he says, disclaiming any intention of claiming his patent or discovery to any mode that was before applied to stocking fabric, and also the mode in which heat was applied before to woven fabrics, he says, "what I do claim is, the submitting hosiery and similar goods, made of elastic stocking fabric, to the pressure of hot boxes or surfaces, heated by steam, hot water, or other fluid, as above decribed." Confining it clearly, by that allegation, to the description of the same machine which he has given in particulars before. It seems to me, therefore, this is a claim only for that machine; but then it would no doubt be a piracy of that machine, if the shape of the box was altered and still producing the same result; for instance, if instead of a square box, given in the drawings attached to this, there had been a box in the shape of a cylinder, pressing one on the other, or a box in the shape of a half globe pressing on the other half globe, they would be infringements, because they would have fallen precisely within the principle of the invention, and would be substantially the same; but it seems to me that the word *surface* does not extend the invention beyond that it is introduced for the purpose of shewing the claim of the inventor, not merely to a box of that particular shape, but to any other similar machine, by which heated surfaces could be pressed on goods—by which heated surfaces containing the water in them could be pressed on goods. So that that would include a surface attached to any vessel of any shape he chose; but the principle of the patent clearly is, that this is to take place by simultaneous pressure for a continuous period, and simultaneous pressure of every part of the pressing substance upon the substance to be pressed, and that for a continuous period.

Now the machine which the defendant has made use of is one perfectly different in principle, for it is a cylinder which does not press simultaneously at all,—it merely touches the goods as it passes over them. It seems to me that that is not within the meaning of the specification, and that the jury were perfectly correct in finding it was not substantially a colorable imitation of it. It seems to me, therefore, and I own I feel not the least doubt about it, that this specification does not claim the general mode of applying hot surfaces to knitted fabrics, but that it is merely for the particular machine described in the specification, and that particular machine certainly has not been pirated by the defendant.

Mr. Baron Alderson.—I am of the same opinion—the invention is twice described in the specification: at the beginning it is described "that the invention consists in submitting hosiery and similar goods, made of elastic stocking fabric, and known by the name of lambs' wool, worsted, and Angola, to the finishing process of a press, heated by steam, hot water, or other fluid, in the manner hereinafter mentioned." At the end the party claims "the submitting hosiery and similar goods, made of elastic stocking fabric, to the pressure of hot boxes or surfaces, heated by steam, water, or other fluid, as above described." Therefore, he claims, both at the beginning and at the end, a particular and described mode in which hosiery is to be submitted to pressure by means of a press. Now then, in what way is that done? The first thing is to describe the press—he describes it. I do not say he is bound by the exact description, because any thing which would be a mere colorable evasion of that machine would be a violation of the patent for the press. Then he describes the mode in which the articles to be pressed are submitted to this pressure, and he describes it in this way,—that he places the hosiery articles upon a shape of wood, places them upon a box, puts them between the two boxes,—*two boxes*, each of them being heated,—and then squeezing and pressing, by means of an hydraulic press, or by means of a screw, or any other mechanical contrivance. Squeezing those boxes together, he presses at one and the same time every particle of the thing to be pressed, and equally; and further, his machine is of that description as that it is clear that he can either press it momentarily, or press it for a short time, or press it for a long period: the mode of submitting it to the pressure is by some contrivance that will submit the whole article at one and the same time to one and the same pressure, and will be able to continue it momentarily, for a short time, or for a long period. Well, that being the nature of the invention, we come now to the infringement of it,—and the question is, whether the jury might not very reasonably find it was no infringement of such a patent, which is for submitting hosiery in this particular manner to a press—that it was no infringement of it to place that same hosiery between two pressing rolling rollers, which do not press the whole article to be pressed at one and the same time, but which presses on each portion of the article successively; which cannot press on any part of the article for more than a momentary time; and which therefore neither complies with the condition of pressing the whole article at one and the same time, nor with the capacity of pressing it for a longer or for a shorter period, as the article in question may require it for the purpose of finishing. It seems to me that the jury were well warranted in saying, a machine which so materially differed from that for which the patent had been taken out is no infringement of that patent. They have said so. I think they would have been very wrong if they had come to any other conclusion.

Mr. Baron Rolfe.—I am of the same opinion. The specification begins thus, "I hereby declare the nature of my said invention, and the manner in which the same is to be performed, are fully described and ascertained in and by the following statement thereof, reference being had to the drawings hereunto annexed, and to the figures and letters marked thereon," that is to say, there is a general description of the drawing, describing the particular sort of press, and the contest now is, that the invention and manner in which it is to be performed, although they may be ascertained by reference to this drawing, may also be ascertained by words and reasoning wholly irrespective of the drawings, and with reference to some machine that has no connection with that drawing. The specification then goes on to say, that the invention consists in submitting hosiery and so on to the finishing process of a press heated by steam. Now I very much doubt whether, in common popular parlance, two rolling cylinders would be termed a press. Certainly they would not be termed a press, as having any similitude or connection with the description of drawing here given;—after describing that drawing the inventor then goes on to say,—"Having thus described the description of the press I prefer,"—he goes on to say, there may be a variation from it, and no doubt it would not be necessary, in order to be an infringement, that the party should have made the press exactly in the same mode—if he has made a press that went in any other mode; that is, a pressure occasioned by a lever instead of a screw, or a variety of other ways; that, no doubt, would be an infringement; but still I conceive, that in order to be an infringement of that which the plaintiff is using, it must have been a *press* within the meaning of that word as there described, which is a press, the general nature of which is described by that drawing.

I confess also I have, all along, felt great concurrence with the observations of my brother Alderson, that it is obvious, from the whole scope of this specification, that the press, for which the invention is claimed, is a press which might press for three minutes, at least, continuously. Now, the instrument which the defendant has used, is one which can only press momentarily—which, in popular parlance, would not be said to press at all,—it is done in the shape of a roller; and, therefore, seems to me to come entirely out of the description of the specification. Taking into account that the defendant begins by saying what he claims is pressure, in the manner hereinafter mentioned; and ends by saying, he claims the pressure as above described; and I feel no sort of doubt, that the invention which he has claimed has not been infringed by these rollers, which has no resemblance whatever to the instrument which he has described in the specification.

COURT OF COMMON PLEAS.

Wednesday, Dec. 1, 1847.

Before Mr. Justice Cresswell and a Special Jury.

WARD *v.* KEY.

This was an action brought for the alleged infringement of a patent granted to the plaintiff, Dec. 9, 1837, for improvements in the manufacture of drums,—and also for a malicious imputation cast by the defendant upon the new construction of drum. The invention (a description of which will be found in Vol. XXIII., p. 415, of our present series) consists in a mode of tightening the drum-head of kettle and other drums by the operation of an internal screw, instead of using sliding-straps, braces or tags. This screw, acting upon the cords attached to the stretching-frame of the parchment, tightens the drum-head with great expedition, and admits of the pitch of the drum being instantly changed to suit the varied keys in which the pieces to be performed are set; it also refers to the forming of a series of holes in the kettle or the framework of the drum, the effect of which is to improve the sound of the instrument.

Mr. Watson, Q. C., Mr. Montagu Smith, and Mr. Lush, appeared as counsel for the plaintiff; and Mr. Serjeant Byles, Mr. Grey, and Mr. W. Watson, for the defendant.

After the evidence of the plaintiff had been gone through, Mr. Byles objected that on the first issue there was no evidence of an infringement of the patent, the alleged infringement being a totally different mode of obtaining the same result of tightening the drum-head.

On this point Mr. Justice Cresswell ruled that there was no evidence to go to the jury. Whereupon Mr. Watson tendered a bill of exceptions to his Lordship's ruling.

His Lordship, in summing up, told the jury, that no evidence had been given of any malicious imputation being cast on the plaintiff's drums by the defendant; on this point they would therefore find for the defendant. He had also ruled that there was no evidence to go to the jury as to the infringement of the patent, which ruling would be excepted against. On this issue the jury would, therefore, find for the defendant. The next issue was, that the plaintiff was not the true and first inventor of the improvements which he claimed. These improvements were fourfold, and they must be satisfied on this issue that all were new inventions. One of these inventions claimed was, to tighten the drum-heads simultaneously, by means of wires or rods provided severally with a hook at one end, and a screw and nut at the other; which rods were fastened to each head of the drum. This it appears was the old mode of tightening a tambourine, which was a drum with one head. He should ask them to say, whether this was a substantial novelty in its application? If they were not satisfied that it was, then the plaintiff failed altogether on that issue. He thought that the having a series of holes in the drum was new; but the jury would say whether they were new or not. It was admitted on the following issue that they were improvements.

The jury, after a short consultation, said, they were of opinion that the verdict should be for the plaintiff generally. They were unanimously of opinion that there had been an infringement of the patent.

Mr. Justice Cresswell.—It is usual, gentlemen, when a judge tells a jury, after argument between counsel, that there is no evidence on any issue, to take his ruling, which is subject to a bill of exceptions. But the jury have a perfect right to say the judge is wrong; but then, if they do, they must hear the whole case; and, therefore, if you wish to hear the whole case and the evidence on the other side, the case must go on. The only question is, whether you will adopt the direction of the judge for the time?

The jury, after a short further consultation, said,—We are bound to adopt the decision of your Lordship. We find for the defendant on the first issue, and on the rest for the plaintiff.

Scientific Notices.

ON STEAM NAVIGATION.

BY M. LE BARON SEGUIER.

[*Translated for the London Journal of Arts.*]

The best mode of propulsion for steam-vessels has of late been the subject of much enquiry; and many truths have been elicited by the numerous experiments which have been undertaken. Paddle-wheels (which were the first propellers adopted), if their floats cease to propel while in contact with the water, will possess many and great disadvantages. Every time that (from the rolling of the vessel or the action of the waves) a float, in a horizontal position, strikes the water, it does not act in a manner to propel the vessel forward, but tends to raise it; and the weight of the vessel being more than equal to the power which rotates the wheel, it will either be quite stopped, or its speed much slackened. An enormous amount of power is thus expended in retarding the progress of the vessel instead of propelling it. Moreover, all the floats being fixed, when one of them, in rising out of the water, only possesses an angular speed inferior to the momentum acquired by the vessel, the lower floats themselves become an obstacle to its forward progress; as, in that case, they must be added to the section of the vessel as a resisting surface. On suspending the action of the propeller, when it is desired to set the sails and take advantage of a fair wind, the surface of the lower floats form a constant resistance, added to that of the midships frame of the vessel. This serious evil can only be avoided, by throwing the wheels out of gear, and allowing them to run loosely; or by the tedious, and sometimes dangerous, operation of dismounting the floats from the lower part of the wheels;—this latter course is preferred.

In order to avoid the evident loss of power caused by the floats of the wheels not acting uniformly as propellers during the whole time they are in contact with the water, it was proposed to make them moveable, whereby they would be protected, whilst still in a horizontal position, from the shock of the waves; and, on leaving the water, they would rise without lifting backwater; but the advantages these moveable paddles presented, were found to be counterbalanced by their comparative want of durability.

Many modifications have also been made in the wheels with fixed paddles; for instance, they have been inclined and caused to enter the water in an oblique direction to the axis, in order that they may act under the water, according to the principle of White's gearing; they have also been divided in their length and depth, and set in various manners in epicycloidal curves; wheels have likewise been made with curved floats in the form of the flukes of an anchor; and floats, pierced with holes, but provided with an extra amount of surface, corresponding to the loss in such perforations, have been tried, to increase their resistance.

The defects of ordinary float-wheels are so manifest, especially at sea, that ever since the application of steam to marine propelling, a great variety of propellers have been invented for the purpose of superseding their use. Among these are—endless chains, furnished with a number of paddles, and running along the sides of the vessel, parallel with the keel; the action of a swan has been imitated, by the alternating motion of jointed rods furnished with blades; the oblique action of the tail of a fish has been imitated, by one or more blades being moved backwards and forwards at the stern; and by screws with one or more threads. This latter contrivance, which was proposed as an hydraulic mover by *Duquet*, towards the middle of the last century, and as a propelling apparatus for steam vessels by *Dallery*, at the beginning of this century, and experimented upon, in all its combinations, by the constructor *Sauvage*, has not however met with approbation. The experiments to which the screw has been subjected, on a large scale, have brought out both its good qualities and defects. The undoubted advantages which it possesses are, simplicity, compactness, and lightness, and its adaptability to the sides on the after-part of the vessel. With regard to its defects, they are of two kinds, some relating to its mode of action, and others to its position. The surface of the helix, which will necessarily be of limited dimensions, must, in order to find a sufficient *point d'appui* in the liquid, revolve with considerable speed; the water must, without having time to be displaced, oppose to it the *inertia* of its mass, without which the work will not be effectual. No successful result has been obtained with the helix until, by means of powerful agents, a rotatory motion was communicated to it, sufficiently rapid to cause the water to act as a female-screw; the helix then acting as a screw in it, and having its *point d'appui* against the vessel, gave some idea of its power. Resistance being thus obtained in the water, the impulsion is necessarily transmitted to the vessel at a single point, viz.,—the extremity of the shaft; but here the defects of the helix become apparent; the resistance which the end of the shaft has to overcome, being equal to the power employed to move it, a rapid destruction of the mechanism and loss of power, owing to the friction, are the result. The impossibility, or at least, the extreme difficulty of getting at the screw and the bearings of its shaft, in a great degree counterbalance the advantages of its submarine position. In consequence of its being placed at the stern of the vessel, a very long shaft is required to communicate with the engine, which is situated nearly in the centre; whereby considerable vibration is produced, which cannot be otherwise than prejudicial. When the vessel is sailing, the screw offers a continual obstacle to the progress of the vessel, even if thrown out of gear; but of all its disadvantages, the greatest is the impossibility of repairing this kind of propeller in case it should get out of order at sea.

M. Seguier having observed that steam navigation had not yet arrived at perfection, sought some means of more effectively combining the power of the wind with that of steam. These two modes of propelling may be combined without injury, and will, according to circumstances, produce either the sum of their united forces, or each one, separately, the product of its greatest power.

In order to attain these results, M. le Baron Seguier caused a small experimental vessel to be launched on the Seine, similar in form to the canoes used by Indians, and carrying telescope matting half wood and half iron, and capable of being set at any required height; its propelling wheels were worked by a steam-engine, and furnished with floats turning on pivots.

The idea of these moveable floats is not new; in 1819 an iron boat, the *Aaron Manby*, constructed in England, proved the disadvantages of a wheel constructed on that principle, when the floats do not work according to the mathematical rules laid down by M. Seguier. M. Buchanan, in America, and M. Sciardo, in France, had both the same idea; but they probably did not sufficiently take into consideration the fact, that to ensure the proper action of such propellers, and also their durability, their movements must be so arranged, that the floats shall pivot at their minimum speed, at the beginning and end of every such movement.

The floats on M. Seguier's wheel are independent, and turn on their pivots, which are radial, and work in long bearings of hard metal; the crank with which their axis is furnished, causes them easily to follow a directing curve, which has no other resistance to overcome than the simple friction of the axes or pivots of the float. This curve is adjustable, in order to vary the time of its action on the floats. These floats, being prepared by a slight deviation of position for the angular movement which they continually receive from the water upon which they act, give way instead of resisting. All shocks are avoided, by the care which M. Seguier has taken in tracing the directing curve, so as to guide the float and stop it at its mininum speed. It is this property of the wheel to which M. Seguier attaches the greatest importance, as it is that alone which ensures its durability.

The wheel may be of any size, and several rows of floats, placed in juxta-position, may be guided by one directing curve, so as to move simultaneously; for this purpose it is only necessary to unite all those composing one row by a common rod. By causing the float thus to move in a radial direction, a great advantage is obtained, viz.,—that of presenting its edge to the water whenever the movement of the vessel or the water shall be such as to have a tendency to retard the motion of the wheel.

In his directing curve, M. Seguier has substituted for the ordinary friction of the collar of the excentric, a rolling friction, by means of friction-rollers.

When this wheel is at rest, owing to its floats being able to pivot, the wheel becomes a kind of lee-board, when the directing curve has been so adjusted as to cause the lower floats to assume a position in a line with the keel of the vessel. This much facilitates the progress of the vessel under sail, especially if it is not provided with a high keel, and draws but little water.

M. Seguier's vessel (the lines of which were laid down by M. de la Morinière, ex-engineer in chief of the Navy) may be propelled either by the wind and steam combined, or by either separately.—[*Bulletin de la Société d'Encouragement.*]

PROCESS FOR GILDING THE WHEELS OF WATCHES AND CHRONOMETERS.

Submitted by M. PLANTAMOUR to the Academy of Sciences, Paris, at a late sitting.

THE desire for improvements in the construction of time-keepers, with the view of obtaining the greatest correctness, combined with elegance, has led to the practice of gilding the wheels. Gilding by mercury is impracticable, as it requires an amalgam surface, produced by an acid solution of mercury in aquafortis; the application of which would completely destroy the steel pinions.

The present process obviates this: it consists in using for the amalgamation, a solution of mercury, which will not effect the steel, either in a cold or warm state. To prepare this liquor, a small quantity of mercury is dissolved in a quantity of nitric acid, sufficient for this latter to be in excess; the solution is afterwards saturated by ammonia, and the precipitate is then re-dissolved in an excess of the alkali.

To operate upon the wheels with this solution no great precaution is necessary; they may be immersed entirely in it, and left there for several minutes, without the pinions being in the slightest degree injured. The ammonia in excess rapidly cleanses that part of the wheel which is to be gilt, and the surface becomes very speedily amalgamed.

In order to apply the gold, the wheels must be withdrawn from the mercurial solution, and the amalgam of gold is laid on without the necessity of wiping them. This being done, they are heated upon a small cylinder or drum, made of sheet-iron, a spirit lamp being applied underneath. The upper surface of the cylinder has a hole made through it, to admit the pinion, and allow the gilt part of the wheel to be heated, without heating the pinion to an extent which would affect its temper. By means of a coarse brush, the grained or deadened appearance, usual in the works of watches, is produced; and after cleansing with a scratching brush and soap and water, the wheel will be gilt and finished; the pinion remaining as bright as it was before the operation.

By means of this process, chronometers, intended for long voyages, may be protected from the influence of the sea air, which often deposits saline particles.—[*Ibid.*]

Academy of Sciences, Paris.

PHOTOGRAPHY,—REPORT ON SOME EXPERIMENTS,

BY M. NIEPCE DE SAINT VICTOR.

ON the 23rd October last, M. Niepce de Saint Victor communicated to the Academy the result of some experiments which he had been engaged in; and a commission was thereupon appointed (consisting of M. M. Biot, Arago, Thenard, Chevreul, and Regnault) to report thereon, and the following was the result of their investigations:—

It would appear that chemists and natural philosophers have not given equal attention to the different kinds of molecular action. Those actions by which definite combinations are effected, have occupied the attention of chemists almost exclusively, whether the said combinations were such as are produced by the most energetic affinity, by which such bodies as oxygen, chlorine, &c., are combined with potassium, sodium, &c., or those resulting from the double neutralization of acids and alkalies; or those definite ternary or quaternary compounds, in which one of the elements (hydrogen, for instance) is expelled by another body, such as oxygen, chlorine, &c. Chemists have not directed their study to the passing phenomena of these actions, but have extended it to the properties of the products.

The molecular actions by which indefinite compounds are formed, such as most metallic alloys, solutions of solid bodies or of elastic fluids in neutral liquids, and solid compounds produced by cementation, such as steel, have occupied the attention of chemists, and also of several natural philosophers,—as it seems, that in indefinite compounds, the weakening of the molecular action brings the phenomena very near those which properly belong to physics.

The molecular action by which bodies dissolved in liquids become incorporated with solids, without apparently changing the form of the latter, as is the case in the process of dyeing, have scarcely as yet been looked into, except by that class of chemists which have made the process of dyeing their study.

With regard to that kind of molecular action by which water gives to animal tissues the properties necessary for performing their several functions, and by which several pulverulent inorganic bodies are converted into tenacious and plastic masses, it has not received so much attention as the preceding.

Chemists and philosophers have also studied the action which certain solid bodies, particularly those which are porous, or are reduced to an impalpable powder, exercise by their surfaces on elastic fluids. Their attention has been more particularly directed to the phenomena which take place during action, rather than to the permanent properties acquired by the bodies; this is a very obvious result, when it is considered that, according to many chemists, the affinity on which the definite combinations are made to depend, does not exist in the case now under consideration.

It will thus be seen that, at a certain limit of molecular action, the chemist and natural philosopher meet in the study of phenomena, which, according to the opinion of some, have, properly speaking, nothing to do with affinity, but seem rather to belong to purely physical action. However this may be, the products of these actions do not possess properties of a permanent nature, or a constitution capable of being determined in such a precise manner as to admit of their being compared with chemical compounds, properly so called, or even with those compounds, the proportions of the elements of which are indefinite.

It has been thought advisable to direct attention to this state of the science, in the hope of rendering intelligible the report of the researches of M. Niepce de Saint Victor, and the present position of our chemical knowledge; for in the experiments which he has described, the influence of affinity is incontestible; and definite compounds are formed analogous to those produced in the process of dyeing, in which the fabrics combine with acids, bases, salts, or with coloring principles, without changing their form; besides this, vapours also combine with solids, by reason of an attractive force, sufficient to overcome merely a portion of their tension; so that, in a vacuum, or in a space which only contains a certain quantity of the same vapour, solids will give off the whole, or, at least, a portion of that vapour which they had previously taken up.

We will now treat of the reproduction of an engraving or print upon starched paper, or upon a layer of starch, by means of iodine vapour.

The fact of reproduction is indisputable, and one cannot trace, without astonishment, the fidelity with which the most delicate lines of the original are reproduced.

In a scientific point of view, the study of their reproduction is very interesting. When the original is exposed to the action of vapour of iodine, this latter acts upon the black rather than the white parts; this does not however mean, as some persons have supposed, that it will not act at all upon the white parts; for, on prolonging the operation, they will become of a brownish orange color, by the vapour of iodine being condensed therein.

The question therefore is, what are the truths elicited by M. Niepce's experiments? They are:—

1st. That the black parts absorb the vapour of iodine more quickly than the white parts, and in a greater proportion; that, by exposing an engraving to the iodine vapour for such a length of time as not to affect the white parts, the black iodized parts may be reproduced on copper, or even on a layer of starch.

2nd. That if an engraving has been exposed to the vapour of iodine a sufficient length of time to iodise the white parts, by exposing it to the air a suitable time, the iodine will leave the white parts, while a sufficient quantity of iodine will remain in the black parts, to allow of their being reproduced.

All these effects will be manifested by taking the bodies at an even temperature, and putting them in the presence of each other, either in light or darkness, and either in vacuo or in the atmosphere.

[*To be continued.*]

SPONTANEOUS REPRODUCTION OF IMAGES UPON PORCELAIN.

Discovered by M. ZANTEDESCHI.

M. POBBS recently presented to the Academy of Sciences, Paris (in the name of Professor Zantedeschi), a piece of porcelain, upon which a curious effect had been produced, and respecting which the following explanations were given:—Several discs of porcelain were painted on one side with oxide of cobalt, and covered on both sides with a coating of ordinary porcelain varnish. These discs were piled up in an oven in such a manner that the painted side of each disc faced the plain side of the following one, at distances varying from one-eighth of an inch to an inch apart. On withdrawing the porcelain from the oven, after being baked, a blue image was observed on that side which had previously been white, similar to the design on the opposite side; and the degree in which the picture was defined, varied in proportion to the distance at which the plain and painted sides of the adjoining discs had been placed in the oven.

This image is evidently formed by a kind of spontaneous projection or throwing off of the molecules of the oxide of cobalt, which not only passed through the varnish covering the picture and the space which separated the disc in the oven, but, as far as can be judged by ocular inspection, they also traversed the coat of varnish covering the white surface of the adjoining disc, and were deposited on the opaque ground of the porcelain. M. Zantedeschi repeated this experiment with oxide of iron, and obtained the same effect; but the temperature necessary for producing it was a little higher.—[*Comptes Rendus.*]

Singular property of Caoutchouc, illustrating the value of latent heat in giving elasticity to solid bodies, and the distinct functions in this respect of latent and free or sensible heat.—By CHARLES G. PAGE, M.D., Prof. Chem., National Medical College, Washington, D. C.

THE fact is familiar, that if a strip of India-rubber is forcibly stretched it becomes quite hot, from the development of latent heat, owing to the compression which the particles undergo in one direction, by distension in another; and on suffering the strip to relapse, the heat thus developed is absorbed or becomes latent, and the strip appears with its original degree of sensible heat. While thus much has been known nearly as long as the article caoutchouc has been in common use, yet I believe no special observations have been made upon this point; and the following interesting fact, first noticed by me about ten years ago, has excited no particular attention:—If, when the strip of rubber is in the stretched condition, it be quickly cooled (which can be readily done by wetting it, and evaporating the moisture by vibrating or moving it rapidly in the air), it will be found to have lost its elasticity, and may be left for an indefinite time without regaining its elastic property. It resembles a piece of frozen rubber in some respects, although not quite so rigid. A piece of this substance, which has become stiff and inelastic, by exposure to a great degree of cold, soon regains its elasticity by immersion in an atmosphere of 70° Fahr., or even much below this. But the rubber, deprived of its latent heat by compression, I have kept in an atmosphere of 80°, for several weeks, without its returning to its normal condition. If the heat be raised much above 80°, or if it be placed in contact with a good conductor at 80°, it gradually recovers its latent heat, and in a few minutes is restored to its original dimensions. A curious sensation is experienced if it be enclosed in the hand, like the creeping of an insect. If successive portions of the inelastic strip be pinched between the thumb and finger, it contracts powerfully in these parts, leaving the others unaffected, and presenting the appearance of a string of knots or beads, which may be preserved in this state for any length of time, if not handled, and kept at a moderate temperature. Upon examination by a sensitive thermometer, the thick and thin portions are found to be of the same temperature. As regards the amount of heat contained, the two portions differ considerably; and in respect to latent heat, the thick part may be said to be positive and the thin negative. The junction of the two portions continues abrupt and well defined; thus shewing that there is no tendency to distribution or equilibrium of latent heat between the two portions. When the inelastic strip is enclosed in the hand, a slight degree of coolness is felt from the rapid absorption of heat.

I have been led to revive these interesting facts, in consequence of a recent observation of the difference, in this respect, between the native and the artificial rubber. The artificial rubber is at present prepared in two ways; first, by solution in turpentine and subsequent drying; and chiefly now without the aid of any solvents, by merely grinding the native rubber to a pasty mass, and reducing it to thin sheets between a succession of heated rollers.* In both of these preparations, the peculiarity of the native rubber, above noticed, is hardly perceptible. It is somewhat remarkable that the interesting substance, gutta-percha, appears very much like the India-rubber when rendered inelastic as above, or by exposure to cold. This valuable modification of caoutchouc gives, according to Dr. Maclagan, by ultimate analysis, carbon 86·36, hydrogen 12·15; and caoutchouc, according to Faraday, gives carbon 87·2 and hydrogen 12·8. The gutta-percha yields by destructive distillation similar products to caoutchouc. Like caoutchouc, it is soluble in coal naphtha, in caoutchoucine, and in ether, and insoluble in water and alcohol. "Its most remarkable and distinctive peculiarity," as stated by Dr. Maclagan, in his communication to the Scottish Society of Arts, "is the effect of heat upon it.' When placed in water at 110°, no effect is produced upon it, except that it receives the impression of the nail more readily; but when the temperature is raised to 145° or upwards, it gradually becomes so soft and pliant, as to be capable of being moulded into any form, or of being rolled out into long pieces or flat sheets. When in the soft state, it possesses all the elasticity of common India-rubber; but it does not retain this property long.' It soon begins again to grow hard, and in a short time, varying according to the temperature and the size of the piece operated upon, regains its original hardness and rigidity.'" May not this be a case of isomerism, in which the different arrangement of atoms determines these distinctions? The specific heat of gutta-percha, I presume, has not been determined, but it would be interesting to compare the two substances in this respect.—[*Silliman's Amer. Jour. for November.*]

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* During the operation of rolling, great quantities of electricity are developed.

FRANKLIN INSTITUTE, PHILADELPHIA, U.S.

At a recent meeting of this Society, Prof. W. R. Johnson submitted a verbal statement of the result of an examination of the scales adhering to the interior of the boiler of the Government steamer "W. L. Marcy," presented at the last meeting of the Institute.

The specific gravity of these scales is 2·695. They are laminated and crystalline, with minute prismatic columns crossing the thickness of the deposit. The color is nearly pure white; the side which appears to have been next to the metal is marked with small black specks, apparently of oxide of iron. Their hardness is such, as to allow of being scratched with the nail; but the side which adhered to the iron is perceptibly harder than the other. Acids produce, on them, no effervescence or other evidence of reaction.

It had been stated, at the time these incrustations were presented to the Institute, that the use of *ammonia* in the boiler had been found to obviate the difficulty arising from this deposit. Doubts, however, had been expressed, whether the remedy were due to a true chemical reaction.

Presuming that, by *ammonia* was meant *sal-ammoniac*, some trials were made to determine the efficacy of that salt, in dissolving the scale, as compared with one or two other re-agents applicable to the same purpose.

Having weighed 38 grains of the scale, in small fragments, but not pulverized, they were boiled for an hour, with 27 grains of chloride of ammonium (sal-ammoniac), in about four ounces of distilled water, until no further effect appeared to be produced. The scales had become rather more friable than before, but their form and structure were unchanged.

The liquid, with the washings of the undissolved fragments, treated with chloride of barium, gave of ignited sulphate of baryta 4·05 grains, proving that about 1·39 grains of sulphuric acid had been already brought into solution. The undissolved scale, dried at 212°, was found to have lost 2·9 grains, or 7·6 per cent. As the scale had, at first, been weighed without drying, a small part of this loss is probably attributable to hygrometric moisture.

The residue was next boiled in a solution of carbonate of potash;—the resulting sediment separated, washed, dried, and heated a little below redness, and found to be completely soluble, with effervescence, in chloro-hydric, nitric, and acetic acids. The solid crystalline scale had, in fact, been converted into a pulpy or flocculent mass of carbonate of lime.

The liquid which had been filtered from sulphate of baryta, after boiling with sal-ammoniac, having first been freed from excess of baryta, gave, with oxalate of ammonia, a copious precipitate, shewing that *lime* had been dissolved. On the other hand, the liquid filtered from carbonate of lime, having been acidulated and boiled, gave, with chloride of barium, equally abundant proofs of the presence of *sulphuric acid.*

The foregoing trials prove that sal-ammoniac *is* capable of reacting chemically, to dissolve, in part, the incrustation; and carbonate of potash, to decompose without completely dissolving it;—leaving, at least, carbonate of lime, insoluble, and capable, under certain circumstances, of still forming a scale.

It having been thus made evident, that the incrustation is one of the sulphates of lime, and, by negative proofs, ascertained that the clean scale contains no other essential material, an analysis was performed, which resulted in shewing that it belonged to the same species as the crystals formerly analyzed by Prof. Johnston, of Durham, containing two equivalents of dry sulphate of lime to one equivalent of water; in other words, it was *di-hydrated* gypsum, $= 2CaO,SO^3 + HO$.

To prove more exactly the relation between the respective solvents, 10 grains of the scale, freed from dirt, were finely pulverized, heated to dull redness for 20 minutes, losing thereby three per cent. of water, and then boiled in three successive portions of a strong solution of sal-ammoniac. By this treatment, almost exactly *one-half* of the dried powder was found to have been dissolved. The remaining half was boiled with 20 grains of pure carbonate of potash, in four ounces of distilled water, by which it was rendered completely soluble in chloro-hydric acid.

Wood-ashes may probably be substituted for carbonate of potash, without serious inconvenience; and, to aid the decomposing power, as well as to give completely soluble compounds, acetic acid, or even common vinegar, may take the place of chloro-hydric acid.

To prove the utility of this solvent (the acetate of potassa), a quantity of acetic acid was slightly supersaturated with carbonate of potash, and a portion of the powdered scale was boiled in the solution for about one hour. A few light flocculent particles only remain undissolved, indicating a superior facility of decomposition, to that of chloride of ammonium, and yielding acetate of lime and sulphate of potassa,—both soluble salts.

Besides the scale of the sea steamer, trial was made of one, similar in aspect, obtained some years ago from a stationary boiler used at or near the glass works of Mr. Bakewell, in Pittsburg. That scale had, likewise, a crystalline structure, with small transverse prisms. It had a dirty-white color, was marked with black specks on the side which had adhered to the boiler, and was, without difficulty, scratched with the nail. It was not attacked by acids.

When 19·8 grains were heated to bright redness, for more than an hour, the loss was ·55 grain, or 2·77 per cent. As the color and lustre of this scale are less remarkable than that of the sea steamer, the sulphate of lime is doubtless contaminated with some earthy impurities, and probably with a little animal or vegetable matter; but the quantity of water expelled, clearly indicates that it belongs to the same class of hydrates as the sea-water scale.

In fact, as it is known that a temperature of 300° expels the water from common gypsum, it is inconceivable that true *bi-hydrated* sulphate of lime should be formed within a vessel, in which prevails a temperature often above that limit.

Two or three varieties of scale, from boilers using the water of the Schuylkill, were compared with those above described.

The first was from a boiler, used at Smith's factory, near Fairmount. This scale is dark grey, and in many parts almost black. It has a slight scent of animal oil. This odour became abundantly perceptible on heating to 400° or 500°; and the thick smoke, and strong smell of lamp-oil leave no doubt as to the source of this impurity. Exposed for ten minutes to a dull red heat, in daylight, it lost 8·65 per cent., nearly the whole of which was organic matter.

Treated cold, with chloro-hydric acid, till effervescence ceased, and then boiled with an excess of acid, it lost 83·66 per cent. more, leaving a nearly black powder (part of which was proved to be sulphate of lime), amounting to 7·69 per cent.

Hence, the predominant material in this scale, that to which it owes its chief properties, is carbonate of lime. Faint traces of the crystalline structure, already observed in the scale from salt water, and in the Pittsburg scale, were also found in this, and may probably be due to the portion of sulphate of lime ascertained to be present.

A second scale, of a character similar to the last, from the boiler of Mr. Coggins, also consists chiefly of carbonate of lime, of a reddish-brown color; and a third, from the connecting-pipe of a boiler which exploded a few years since at Kensington, is of the same general character, but less compact, and of a nearly flesh-red color. An obvious solvent for this scale will also be found in acetic acid, or in a substance which can yield that acid to the lime.

REPORT OF AMERICAN PATENTS.

From the "Journal of the Franklin Institute."

BY MR. C. M. KELLER.

To T. R. Hibbard, *assignee of Augustus Mc Burth, New York, for an improvement in veneering.*

The nature of this invention consists in interposing between the veneers or veneer, and body to which it is to be attached or united (or layers of wood to be united), a cotton or linen canvas, or other cloth (the cloth and parts of the wood to be joined being first covered or prepared with glue or other adhesive material), and then placing the parts to be united in juxtaposition; the cloths prepared, as aforesaid, being interposed, and uniting them by any of the known or suitable modes of compression. The cloth, thus interposed, adheres firmly to every part of the adjacent wood, and prevents the veneer from splitting or cracking with the grain of the wood, or leaving the body to which it is attached; it also renders two veneers minutely thin, thus united, stronger and more durable than if united in the usual mode, and than solid wood of many times its thickness or size.

This invention is peculiarly adapted to the veneering or formation of unequal surfaces, or to cases where the veneering wood is required to be bent or compressed out of its natural inclination. It is especially adapted to the construction of wooden tubes or pipes. The mode adopted, in the constructing of tubes or pipes, is the following:—A veneer or layer of wood is first rolled around a rod or shaft attached to a crank, and compressed by a cord or other means, into the required shape. The cloth, saturated with glue or other adhesive substance, is then rolled tightly around the veneer, thus shaped as above, and another veneer, or layer of wood, is applied upon the cloth and compressed, by the means above stated, into contact with every part of the cloth; by turning upon which, the veneers are shaped or rolled over a furnace, and the glue or adhesive matter is made to penetrate every part of the fabric.

The patentee claims the use or application in veneering or uniting layers of wood, of linen, cotton, canvas, or other cloth, covered or prepared with glue or other adhesive substance interposed between the veneers or layers of wood to be united, or veneer or body to which it is to be united, substantially as described; whether this be employed for making tubes or pipes, constructed as above; for the purpose to which they may be suited or applicable, or to any other purpose.

To THEODORE F. ENGELBRECHT, *and* G. F. SKIFF, *of New York, for an improvement in fish-hooks.*

THIS improvement consists in jointing to the stem of a fish-hook another hook, which is forced down by a spring. When set for fishing, the extra spring hook is held up by a sliding catch connected with the line; and when the main hook that carries the bait is pulled by the fish, this liberates the spring-hook, which catches on to the fish.

The patentees claim the construction of a self-acting spring and slide-lever hook for catching fish, construeted as above described; and whether spiral or other springs are employed, or whether the lever is made to descend by being disengaged from a slide, operating as herein described, or by any other analogous process. Also the invention of a hook for catching fish, operated by a spring, a lever, and a slide, whether working as described above, or in any other way.

To George M. Norton, *of Rochester, New York, for an improvement in the cooking stove.*

The patentee says:—"The nature of my invention consists in an oven, so constructed as to bake perfectly even and uniform on all sides, by means of an air-chamber, so constructed as to distribute the heat produced between the plates of the oven-top, and the fire-plate, and the front oven side, into the ends of the oven, or between the plates of the oven doors. Also, the mode of conveying the steam, produced by baking meats, or any other article producing steam, by a draught into the back flue from the oven.

"The nature of my invention also consists in the construction and application of a damper for admitting, by a draught, a great quantity of cold air, to protect the plates most exposed to the fire from burning out; and also, to regulate the heat of the oven when baking. The nature of my invention also consists in the construction of the main bottom plate of the stove, thereby avoiding the difficulty of casting separate, and keeping in its place a flue-plate, which is liable to warp and spring by exposure to heat."

The patentee claims the mode of producing the draught through the air-chamber into the back flue, as herein described. And also the mode of conveying the steam, produced by baking, from the oven into the back flue, as herein described.

LIST OF REGISTRATIONS EFFECTED UNDER THE ACT FOR PROTECTING NEW AND ORIGINAL DESIGNS FOR ARTICLES OF UTILITY.

1847.

Nov. 29. *Joseph Stubbs*, of 1, Thomas-street, Millwall, Poplar, engineer, for an improved lubricator.

30. *John Yates & Sons*, of Birmingham, for the "*comme il faut*" coffee pot and filterer.

30. *Thomas Marsh*, of 1, Charlotte-street, Portland-place, Marylebone, London, for a hand dibble.

Dec. 1. *John Mather*, of Beaufort-street, Chelsea, engineer, for a three-way cock, to be used with hot and cold water or other fluids.

1. *W. W. W. Pigott*, of Birmingham, for a button-back and shank.

1. *William Newton*, of 66, Chancery-lane, London, for an improved adjustable horizon or terminator for a globe.

Dec. 2. *Henry, John, & Donald Nicoll*, of 114, Regent-street, London, for a hooded cloak.

2. *Robertson & Jobson*, of Sheffield, for a stove-grate and hearth-plate.

2. *John Harrison*, of Lamb Mill, Cowling, Skipton, for a railway chair-pin pressing machine.

3. *James Fidden*, of Black Horse Yard, High Holborn, water-closet manufacturer, for an improved water-closet and commode joint.

6. *Thomas Charles Clarkson*, of 31, Bennett-street, Stamford-street, Blackfriars-road, London, leather merchant, for the compressed elastic railway carriage waggon and truck buffer.

6. *George Cole and Ralph Ord*, of 141, High Holborn, for a vapour gas lamp.

6. *Freeman Roe*, of 79, Strand, hydraulic engineer, for a spherical-valved hydraulic ram.

8. *Thomas Powell*, of 12, Bull-street, Birmingham, ironmonger's assistant, for the "[illegible]," or alarm-guard against robbery and fire.

10. *Frederick Pedley*, of 32, Savile-row, Burlington Gardens, for new metallic masticating plates for artificial teeth.

10. *Platt & Son*, of Chester, chemists, for a medicine measure.

10. *Jennens, Bettridge, & Sons*, of 6, Halkin-street West, Belgrave-square, London, and Birmingham, for the Redgrave wine tray.

11. *Parker & Scott*, of 54, Brearley-street West, Birmingham, for the compound pen and pencil-case.

11. *John Leary*, of Rochdale, iron-founder, for a chimney-top.

13. *Jonathan Hunt*, of Kennington Oval, for a double-acting alarm whistle for railway carriages.

15. *William Dray*, of 86, Chiswell-street, Finsbury, for an improved mud and liquid manure cart, for cleaning streets, cesspools, and other such like receptacles for semi-fluid matters.

16. *Henry Sylvester Rogers*, of Salisbury-street, Strand, London, for the infant's assistant or "baby jumper."

17. *Thomas Robert Hill*, of 3, Church-street, Soho, London, for the traveller's door fastener.

17. *Edward John Payne*, of Chancery-lane, for a flanged roller for rolling metals.

18. *Samuel Siddall*, of Dronfield, Derbyshire, for a reaping hook.

Dec. 20. *William Bridges Adams*, of Fairfield Works, Bow, Middlesex, for an axle guard for railway carriages.

21. *John Spurgin, M.D.*, of 36, Guildford-street, Russell-square, London, for a hall shoe-scraper and brusher.

23. *Robert & William Hawthorn*, of Forthbank Engine Works, Newcastle-upon-Tyne, civil engineers, for parts of locomotive engines with cranked axles.

23. *Joseph Dixon*, of 124, London-road, Manchester, ironmonger, for an improved universal mule drum.

List of Patents

That have passed the Great Seal of IRELAND, from the 17th November to the 17th December, 1847, inclusive.

To Thomas Hunt Barber, of King-street, Cheapside, in the city of London, merchant, for improvements in machinery or apparatus for dredging or excavating,—being a foreign communication.—Sealed 29th November.

William Edward Newton, of the Office for Patents, 66, Chancery-lane, in the county of Middlesex, civil engineer, for improvements in the mode or modes of manufacturing or preparing certain matters to be employed as pigments,—being a foreign communication.—Sealed 3rd December.

George Taylor, of Holbeck, near Leeds, in the county of York, mechanic, for improvements in the construction of engines and carriages to be used on railways; part of which improvements are also applicable to carriages to be used on common roads.—Sealed 3rd December.

Henry Cox, of No. 2, Chapel-place, Battersea Fields, in the parish of St. Mary's, Battersea, in the county of Surrey, electro caster, for improvements in the preserving and preparing of wood, bricks, tiles, and other substances.—Sealed 10th December.

List of Patents

Granted for SCOTLAND, subsequent to November 22nd, 1847.

To Pierre Philippe Celestin Barrat, of Rue Castiglione, Paris, for improvements in machinery for tilling and working land.—Sealed 23rd November.

John Morgan, of East Greenwich, manager, for certain improvements in machinery applicable to preparing and spinning flax and hemp, and other fibrous substances.—Sealed 24th November.

Patrick Playfair, merchant, and Laurence Hill, jun., civil engineer, both of Glasgow, for improvements in the manufacture of sugar, soda, and other salts.—Sealed 26th November.

George Phillips, of Park-street, Islington, London, chemist, for certain improvements in the preparation of certain oils and spirits.—Sealed 26th November.

Richard Shaw, of Gold's-green, West Bromwich, Staffordshire, railway-bar finisher, for improvements in the manufacture of wrought-iron railway bars.—Sealed 26th November.

William Rocke, of Dudley, engineer, for a new mode of treating and applying wrought-iron.—Sealed 26th November.

Caroline Watson, of Chorley, for improvements in apparatus for filtering,—being a foreign communication.—Sealed 26th November.

Alexander Campbell, millwright, of Longforgan, Perthshire, for certain improvements in the driving-machinery of thrashing, grinding, and other mills.—Sealed 29th November.

William Edward Newton, of the Office for Patents, 66, Chancery-lane, civil engineer, for improvements in the mode or modes of manufacturing or preparing certain matters to be employed as pigments,—being a foreign communication.—Sealed 1st December.

George Price Simcox, of Kidderminster, carpet and rug manufacturer, for improvements in the manufacture of carpets and other similar substances.—Sealed 1st December.

Amedie François Remord, of Great Charles-street, Birmingham, for certain improvements in steam-engines.—Sealed 2nd December.

Edwin Travis, of Oldham, cotton spinner, for certain improvements in looms and weaving.—Sealed 3rd December.

William Betts and George William Jacob, of Wharf-road, City-road, London, for improvements in the manufacture of capsules, and in the application of designs to certain description of surfaces.—Sealed 6th December.

William Boulnois, of Baker-street, Portman-square, London, for improvements in draught harness.—Sealed 9th December.

Charles Blackford Mansfield, of Clare Hall, in the University of Cambridge, for an improvement in the manufacture and purification of spirituous substances and oils, applicable to the purposes of artificial light and various useful arts, and in the application thereof to such purposes; and in the construction of lamps and burners applicable to the combustion of such substances.—Sealed 10th December.

Henry Cox, of No. 2, Chapel-place, Battersea Fields, in the parish of St. Mary's, Battersea, Surrey, electro-caster, for improvements in the preserving and preparing of wood, bricks, tiles, and other substances.—Sealed 10th December.

William James Walker, of Glasgow, for improvements in weaving. Sealed 17th December.

New Patents

SEALED IN ENGLAND.

1847.

To William Betts and George William Jacob, of Wharf-road, City-road, Middlesex, for improvements in the manufacture of capsules, and in the application of designs to certain descriptions of surfaces. Sealed 30th November—6 months for inrolment.

Frederick William Mowbray, of Leicester, paper dealer, for improvements in machinery for the manufacture of looped fabrics. Sealed 1st December—6 months for inrolment.

Thomas Chandler, of Stockton, in the county of Wilts, for improvements in machinery for applying liquid manure. Sealed 1st December—6 months for inrolment.

William Eaton, of Camberwell, Surrey, engineer, for improvements in machinery for twisting cotton or other fibrous substances. Sealed 1st December—6 months for inrolment.

Gustavus Moenck, of Wellington-street, Strand, Middlesex, Doctor of Laws, for certain improvements in clocks and time-keepers. Sealed 1st December—6 months for inrolment.

Samuel Newington, of Frant, Sussex, M.D., for improvements in dibbling or sowing seed. Sealed 7th December—6 months for inrolment.

James Sweetman Eiffe, Esq., of Lombard-street, City, for certain improvements in the manufacture of astronomical and other clocks, chronometers, and watches. Sealed 8th December—6 months for inrolment.

William Dakin, of St. Paul's Church-yard, London, tea and coffee merchant, for improvements in cleaning and roasting coffee, in the apparatus and machinery to be used therein; and also in the apparatus for making infusions and decoctions of coffee,—being a communication. Sealed 8th December—6 months for inrolment.

John Hackett, of Leicester, for improvements in the manufacture of pill boxes. Sealed 8th December—6 months for inrolment.

James Smith Torrop, of the city of Edinburgh, newspaper proprietor, for improved machinery for time signals. Sealed 8th December—6 months for inrolment.

John Scoffern, of Upper Holloway, M.B., for improvements in the manufacture and refining of sugar. Sealed 8th December—6 months for inrolment.

John Britten, of Birmingham, machinist, for certain improvements in apparatus for cooking, preparing, and containing human food and drinks, and in opening and closing oven-doors, parts of which improvements are applicable to other similar purposes. Sealed 8th December—6 months for inrolment.

Joseph Clinton Robertson, of Fleet-street, City, civil engineer, for certain improvements in the preparation and application of colors suitable for printing stuffs composed of silk or wool, or of a mixture of silk and wool,—being a communication. Sealed 10th December—6 months for inrolment.

Stephen Taylor, of Ludgate-hill, City, Gent., for certain improvements in the construction of fire-arms, and in cartridges for charging the same,—being a communication. Sealed 10th December—6 months for inrolment.

David Williams Wire, of 9, St. Swithin's-lane, London, Gent., for an improved manufacture of candles and other like articles used for affording light,—being a communication. Sealed 15th December—6 months for inrolment.

Henry Winter, of Uxbridge Gardens, Park-place, Bayswater, Middlesex, for improvements in the manufacture of rope, cord, line, and twine,—being a communication. Sealed 15th December—6 months for inrolment.

George Ambroise Michaut, of Epieds, France, but now of New Bond-street, Middlesex, Gent., for improvements in the production and application of heat, and in the manufacture of coke. Sealed 15th December—6 months for inrolment.

William Maltby, of Tredegar-square, Mile End, Gent., and Thomas Webb, of Mare-street, Hackney, Gent., for certain improvements in the manufacture of spirits from grain or other saccharine matters, and in the apparatus to be used therein. Sealed 15th December—6 months for inrolment.

William Westbrooke Squires, of No. 3, Rue Chauveau la Garde, Paris, M.D., for a mode or modes of producing a vacuum; which mode or modes may be applied to pneumatic, hydraulic, and hydrostatic apparatus; and to machinery for obtaining motive power. Sealed 18th December—6 months for inrolment.

Richard Wrighton, of Lower Brook-street, Grosvenor-square, Middlesex, Gent., for improvements in apparatus to be applied to railway carriages and engines. Sealed 22nd December—6 months for inrolment.

Charles André Felix Rochaz, of Paris, merchant, for certain improvements in treating zinc ores, and in manufacturing oxide of zinc. Sealed 22nd December—6 months for inrolment.

Pierre Augustus Puis, of Paris, Gent., for improvements in apparatus for raising and lowering heavy bodies in mines,—being a communication. Sealed 22nd December—6 months for inrolment.

Henry F. Baker, of Boston, in the United States of America, for a certain new and useful improvement in steam-boiler furnaces. Sealed 22nd December—6 months for inrolment.

Richard Baird, of Dundee, in the county of Forfar, Scotland, engineer, for a new or an improved method of communication between the guards, engine-drivers, and other servants, in charge of trains of carriages and waggons on railways; and also between the passengers and engine-drivers, and other servants in charge of such trains. Sealed 22nd December—6 months for inrolment.

Robert Stamp, of Chelsea, Middlesex, hatter, for improvements in the manufacture of fabrics to be used for covering hats, caps, and bonnets; which fabrics may be used for other articles of wearing apparel. Sealed 22nd December—6 months for inrolment.

Charles William Siemens, of Manchester, engineer, for improvements in engines to be worked by steam and other fluids. Sealed 22nd December—6 months for inrolment.

CELESTIAL PHENOMENA FOR JANUARY, 1848.

D.	H.	M.	
1			Clock before the ☉ 3m. 36s.
	—		☽ rises 2h. 45m. M.
	—		☽ passes mer. 7h. 53m. M.
	—		☽ sets 0h. 55m. A.
	7	40	♃'s second sat. will im.
	8	35	Vesta in conj. with the ☉
2	2	26	♀ in conj. with the ☽ diff. of dec. 0. 59. S.
3	13	5	♃'s third sat. will im.
4	15	23	♃'s first sat. will im.
4	20	32	☿ in conj. with the ☽ diff. of dec. 5. 31. S.
5			Clock before the ☉ 5m. 28s.
	—		☽ rises 6h. 43m. M.
	—		☽ passes mer. 11h. 10m. M.
	—		☽ sets 3h. 38m. A.
	1	9	♅ in □ with the ☉
6	0	8	Ecliptic conj. or ● new moon
6	3	39	♃ in oppo. to the ☉
7	12	29	♀ greatest hel. lat. N.
8	6	34	♃'s first sat. will em.
	13	6	♃'s second sat. will em.
9	19	12	Vesta in the descending node
10			Clock before the ☉ 7m. 38s.
	—		☽ rises 9h. 58m. M.
	—		☽ passes mer. 3h. 36m. A.
	—		☽ sets 9h. 24m. A.
10	0	39	♄ in conj. with the ☽ diff. of dec. 4. 5. S.
	14	39	☿ in Aphelion
12	9	55	♅ in conj. with the ☽ diff. of dec. 0. 21. N.
	14		☽ in Perigee
13	11	47	☽ in □ or first quarter
	13	59	♃'s first sat will em.
14	3	53	♂ in conj. with the ☽ diff. of dec. 4. 42. N.
15			Clock before the sun 9m. 33s.
	—		☽ rises 0h. 30m. A.
	—		☽ passes mer. 7h. 59m. A.
	—		☽ sets 2h. 25m. M.
	8	28	♃'s first sat. will em.
	15	43	♃'s second sat. will em.
16	19	25	☿ in conj. with Vesta, diff. of dec. 1. 26. S.
	—		Occul. *a* Tauri, im. 3h. 44m. em. 4h. 29m.
17			Mercury R. A. 19h. 23m. dec. 23. 44. S.
	—		Venus R. A. 16h. 45m. dec. 19. 48. S.
	—		Mars R. A. 2h. 34m. dec. 16. 46. N.
	—		Vesta R. A. 19h. 22m. dec. 22. 19. S.
17	—		Juno R. A. 21h. 20m. dec. 11. 30. S.
	—		Pallas R. A. 11h. 1m. dec. 17. 30. S.
	—		Ceres R. A. 12h. 15m. dec. 13. 16. N.
	—		Jupiter R. A. 7h. 1m. dec. 22. 55. N.
	—		Saturn R. A. 22h. 48m. dec. 9. 32. S.
	—		Georg. R. A. 0h. 54m. dec. 5. 10. N.
	—		Mercury passes mer. 23h. 42m.
	—		Venus passes mer. 21h. 2m.
	—		Mars passes mer. 6h. 49m.
	—		Jupiter passes mer. 11h. 15m.
	—		Saturn passes mer. 3h. 4m.
	—		Georg. passes mer. 5h. 9m.
	—		Occul. *N.* Tauri im. 10h. 26m. em. 11h. 27m.
18	20	47	♃ in conj. with the ☽ diff. of dec. 5. 12. N.
			Occul. ε Geminorum, im. 8h. 32m. em. 9h. 37m.
19			Occul. *k* Geminorum, im. 6h. 18m.
20			Clock before the ☉ 11m. 11s.
	—		☽ rises 4h. 59m. A.
	—		☽ passes mer. M.
	—		☽ sets 7h. 21m. M.
		5	Ecliptic oppo. or ○ full moon
			Occul. 29, Cancri, im. 6h. 9m. em. 6h. 47m.
	15	54	♃'s first sat. will em.
22	4	48	Pallas stationary
	—		Occul. z Leonis, im. 13h. 33m. em. 14h. 9m.
	10	23	♃'s first sat. will em.
25			Clock before the ☉ 12m. 31s.
	—		☽ rises 10h. 26m. A.
	—		☽ passes mer. 3h. 38m. M.
	—		☽ sets 9h. 44m. M.
26	7	38	♃'s second sat. will em.
26	20	0	☽ in Apogee
28	9	42	♃'s fourth sat. will im.
28	11	59	☽ in □ or last quarter
28	12	59	♃'s fourth sat. will em.
28	18	0	☿ in sup. conj. with the ☉
29	12	17	♃'s first sat. will em.
			Occul. θ Libræ, im. 14h. 9m. em. 15h. 6m.
30			Clock before the ☉ 13m. 31s.
	—		☽ rises 2h. 23m. M.
	—		☽ passes mer. 7h. 18m. M.
	—		☽ sets 11h. 59m. M.
31	6	46	♃'s first sat. will em.

J. LEWTHWAITE, Rotherhithe.

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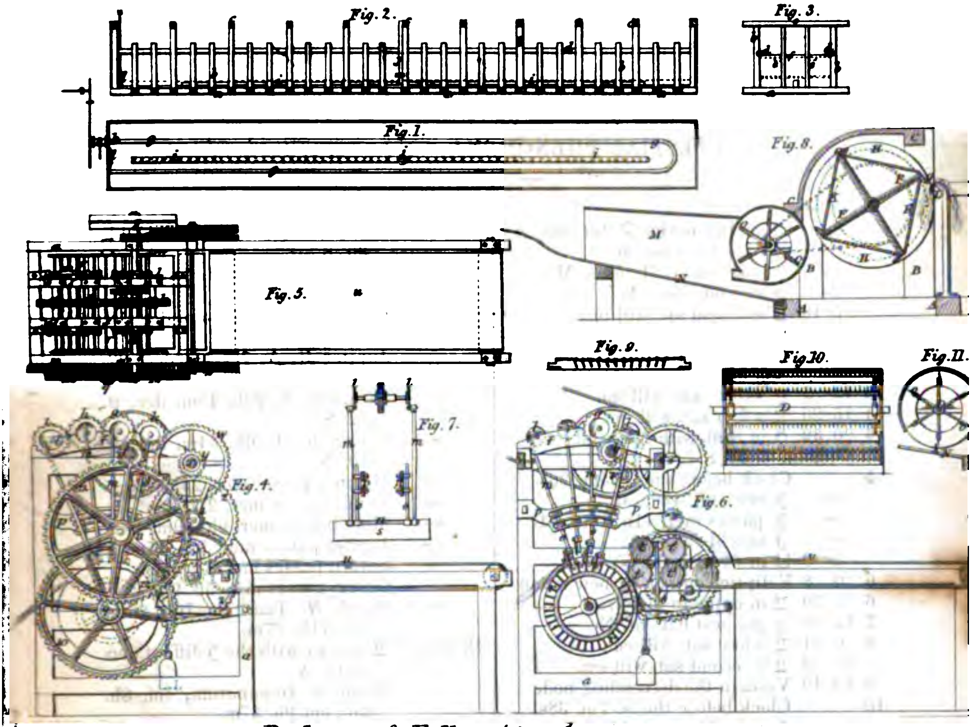
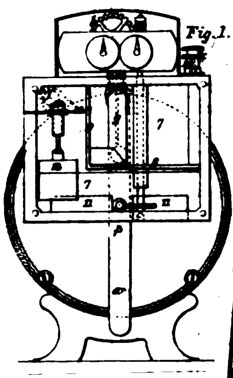
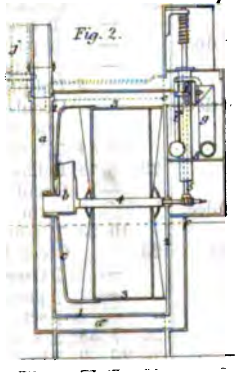
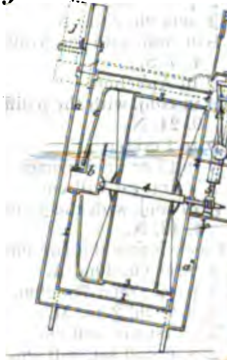
Schenck's impts in dreſsing flax.



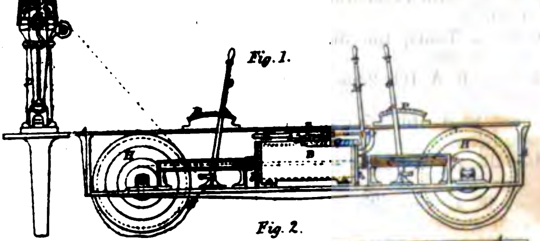
Dickenson & Falkous' impd gas meter.

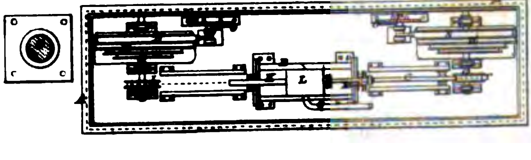




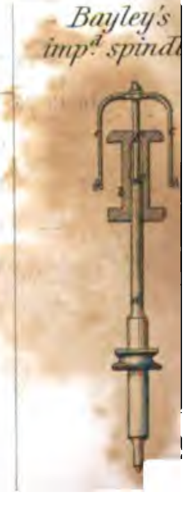


Johnson's impts in lifting heavy bodies.





Bayley's impd spindl



Farthing's imp^{ts} in manufacturing glaſs.

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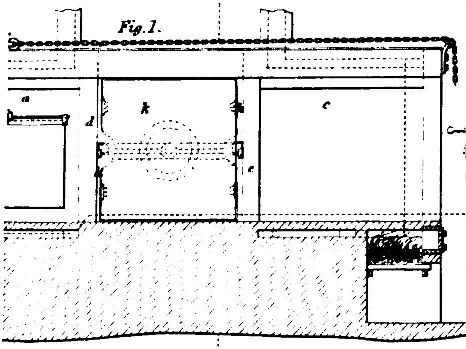

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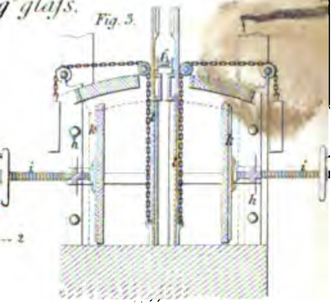

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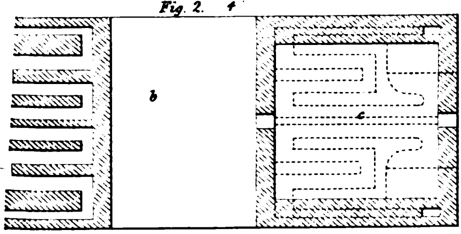

Denton's imp^{d} preſser flye

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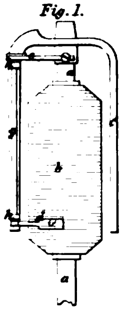

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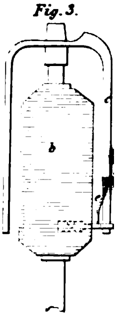

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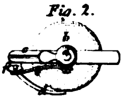

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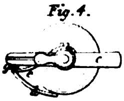
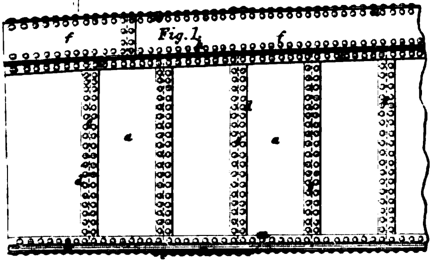


urn's imp^{d} beams for buildings, &c.

Fig. 1.



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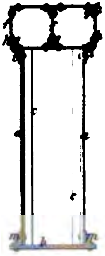

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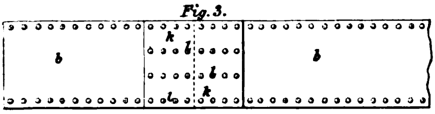

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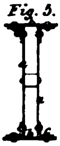

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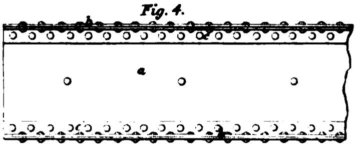

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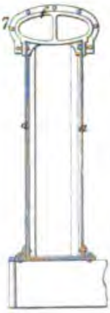

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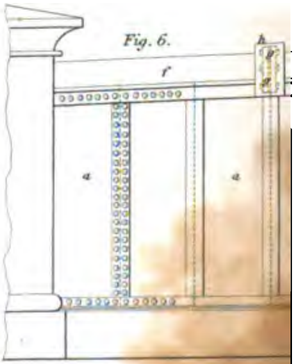

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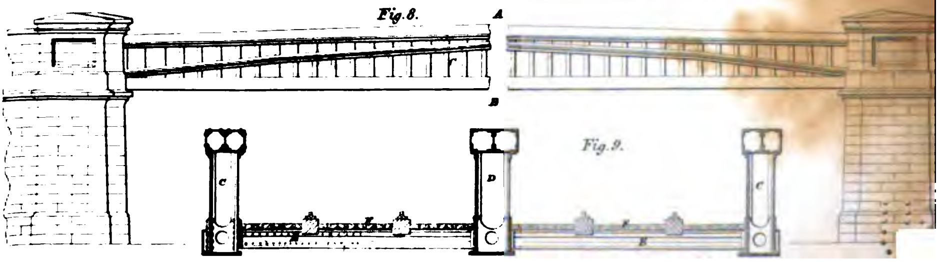
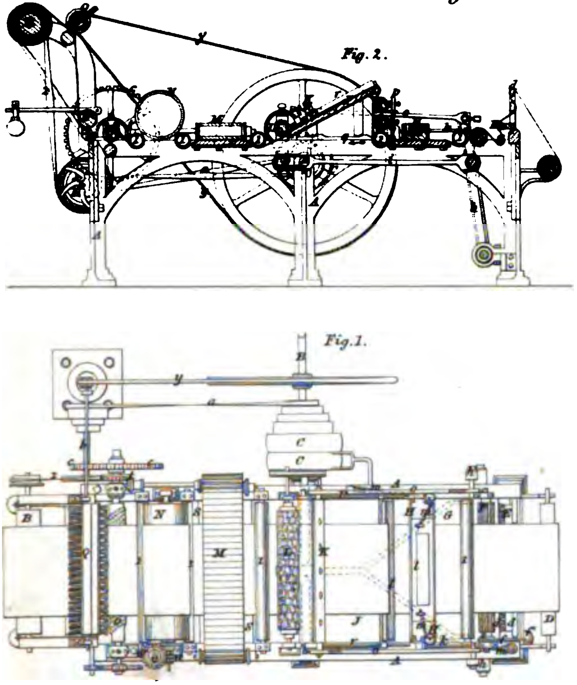
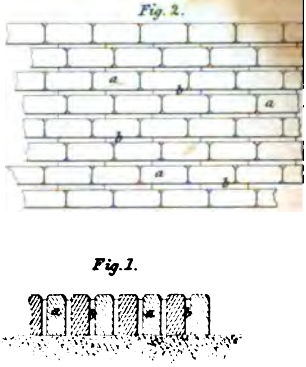


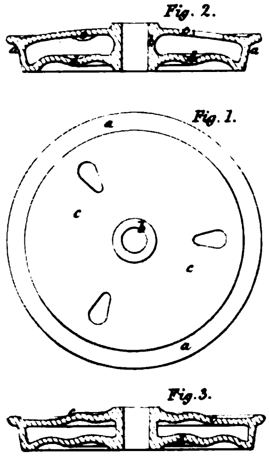
Renshaw's machy. for finishing velvets.



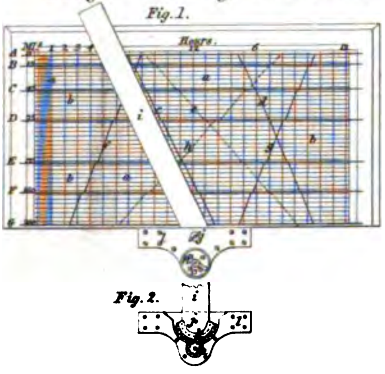
Love's impd. paving.



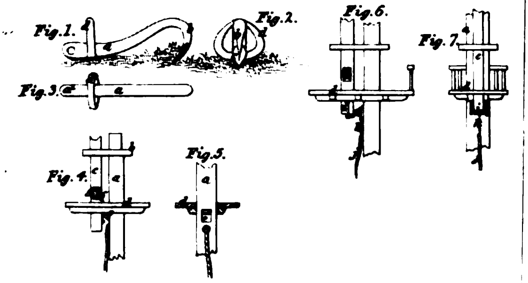
Eddy's impd. wheels.



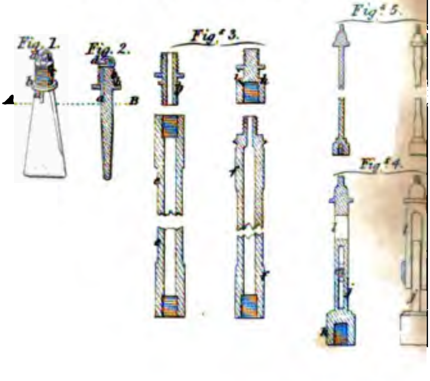
Ybry's railway indicator.



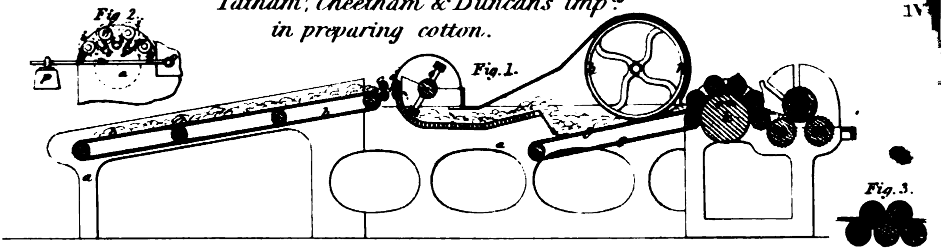
Maccarthy's impts. in anchors & fids.



Taylor's impts. in boring tools.



Tatham, Cheetham & Duncans imp^ts in preparing cotton.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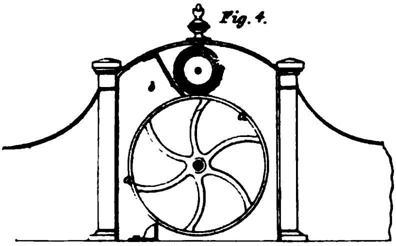
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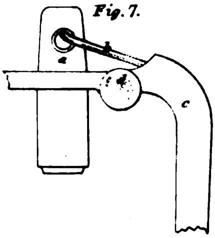
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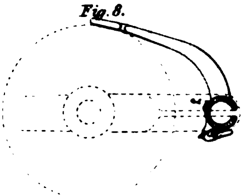
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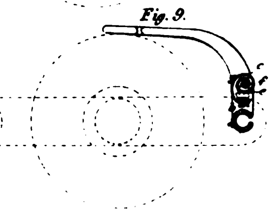
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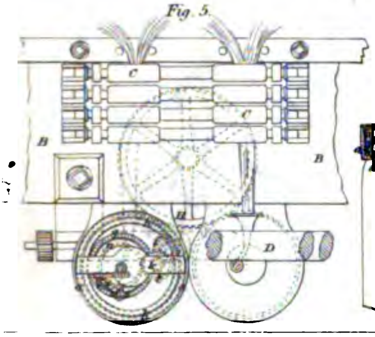
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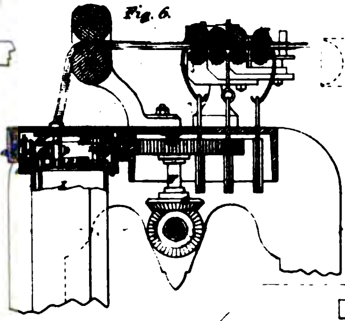
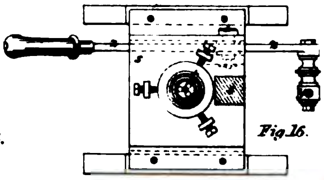


Fig. 6.

Ford's imp^ts in making pottery ware.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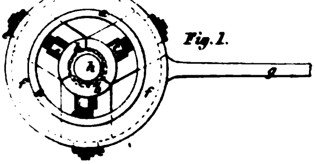
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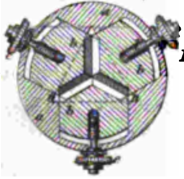
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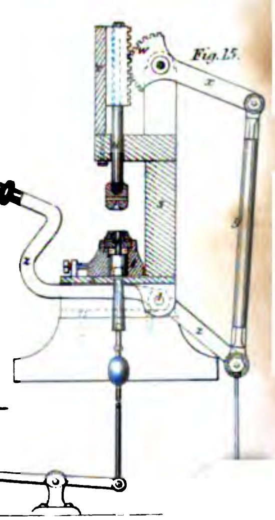
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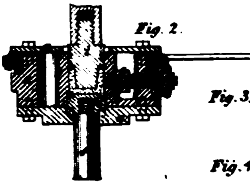
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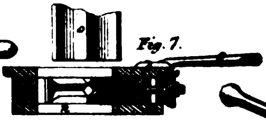
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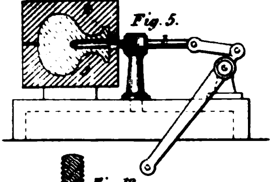
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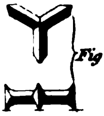

Fig^s 8.

Fig^s 10.

Fig. 13.

Fig^s 9.

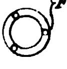
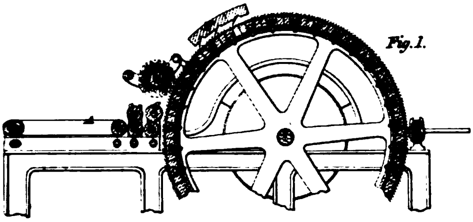

Fig^s 11.

Fig. 14.

Fig. 12.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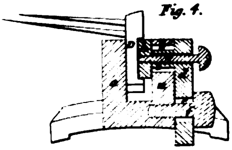
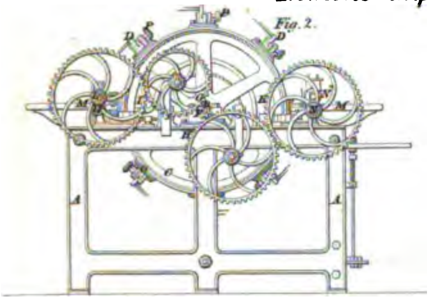


Fig. 4.

Newton's imp.^{ts} in combing wool.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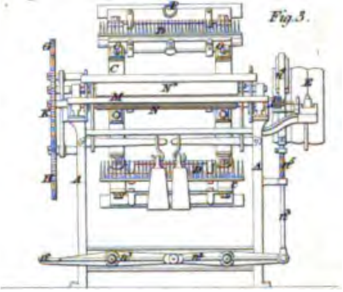
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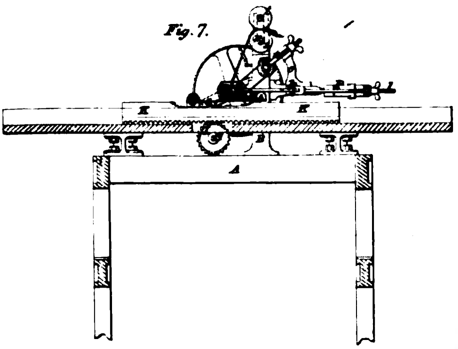
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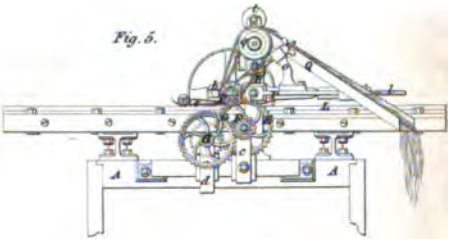
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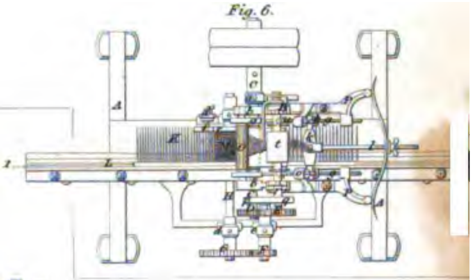
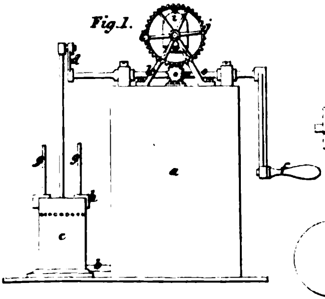


Fig. 6.

Doull's imp.^{d} signal app.^{ts}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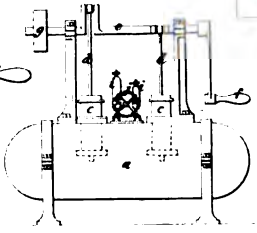
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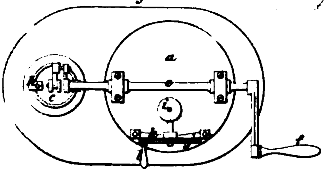
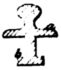


Fig. 2.

Hedge's imp.^{ts} in rails.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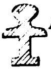
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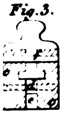
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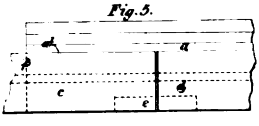
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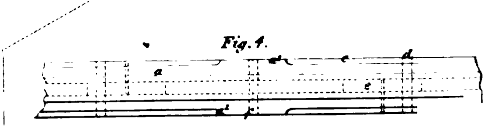
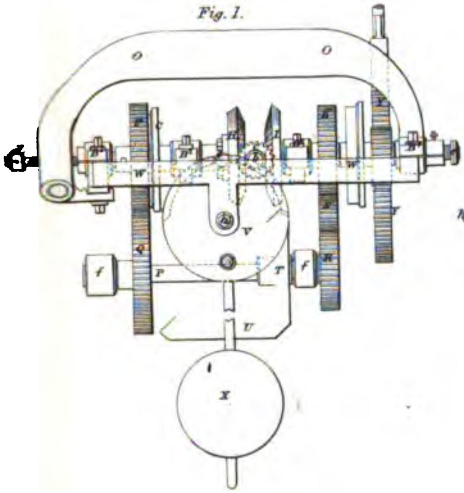


Fig. 4.

Perpigna's impts. in governors.

Fig. 1.



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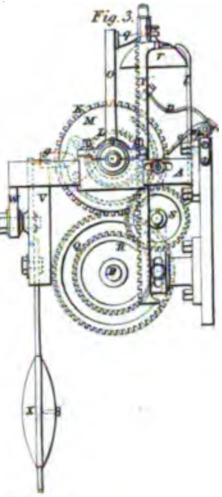
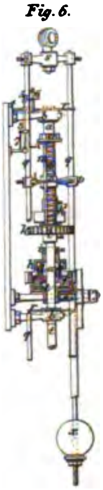


Fig. 6.



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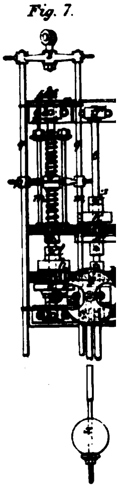

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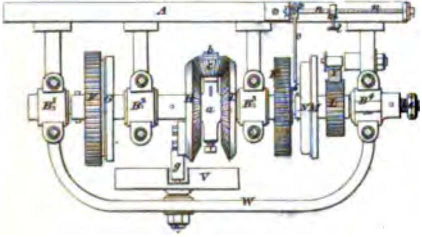

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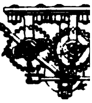

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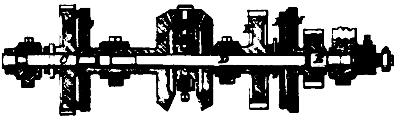

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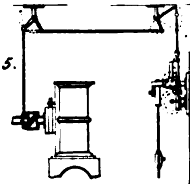
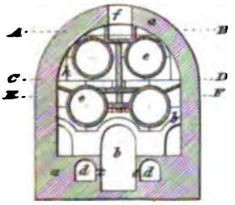


Grundy's impts. in furnaces.

Fig. 2.



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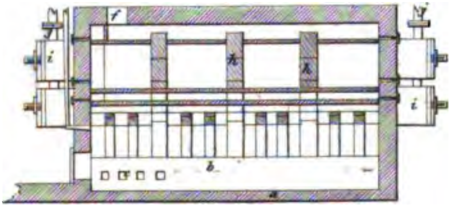

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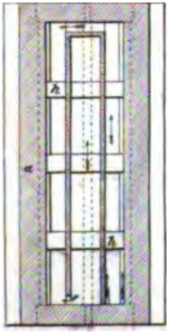

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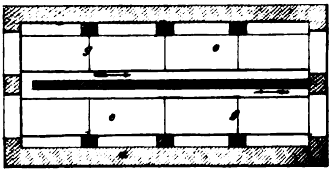

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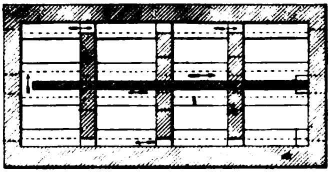

Loach's fastenings for windows, &c.

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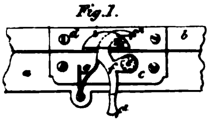

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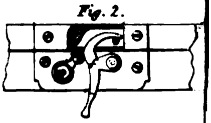

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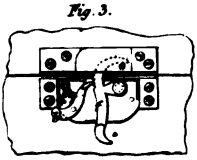
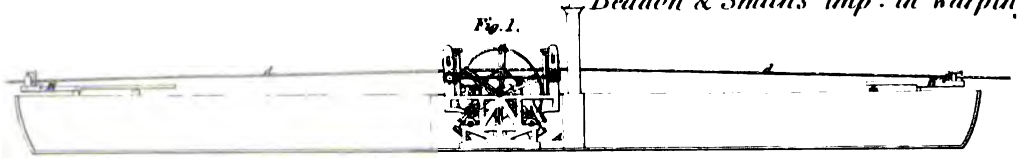


W. Newton del.

1st Septr. 1847.

Beadon & Smith's impts in warping.

Fig. 1.



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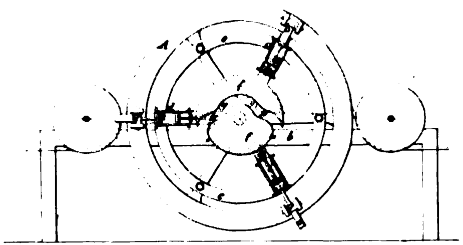

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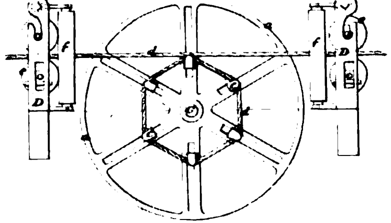

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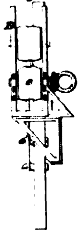

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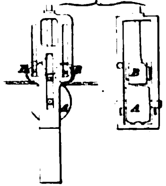

Fig. 9.

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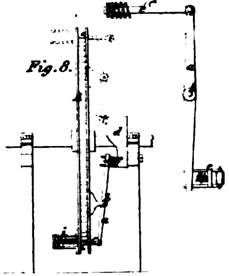

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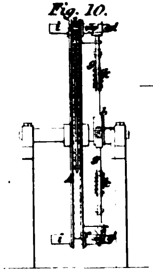

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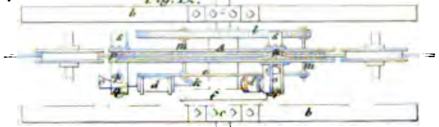

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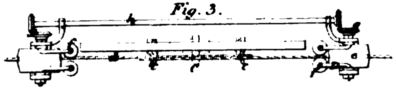
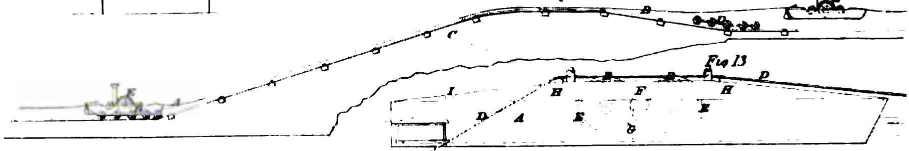


Fig. 14.

Fig. 13



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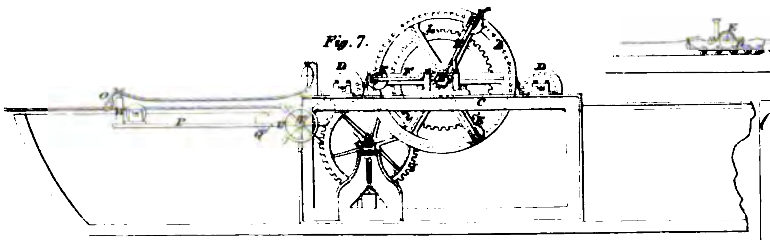

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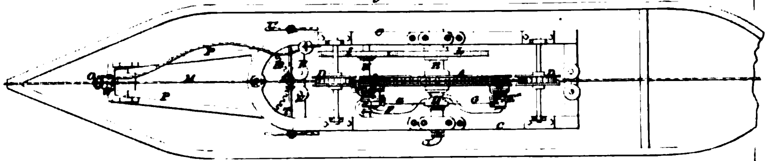
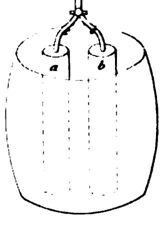


Crosse's treating liquids



Wright's impts in obtaining light.

Fig. 1.

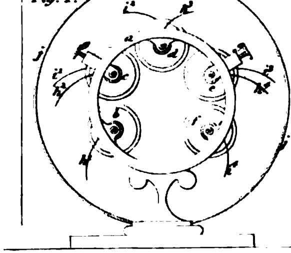
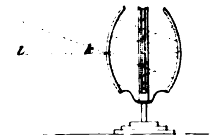
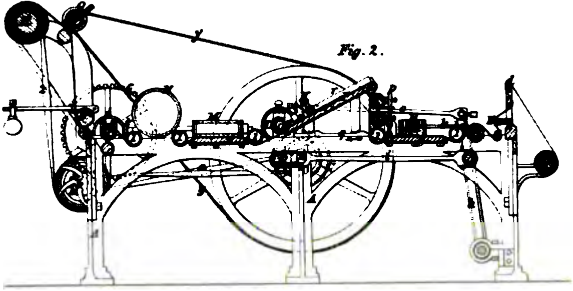


Fig. 2.



Renshaw's mach^y for finishing velvets.

Fig. 2.



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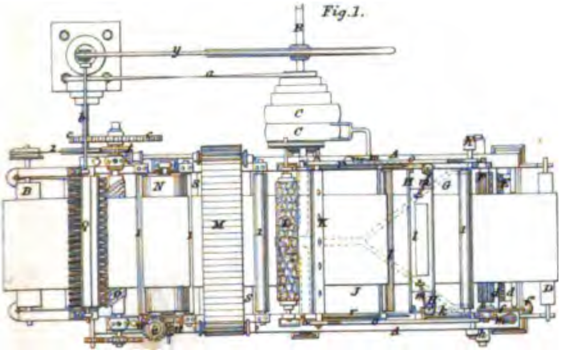
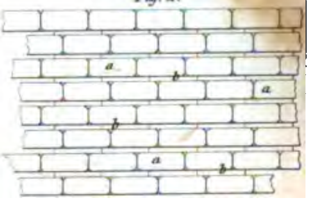


Love's imp^d paving.

Fig. 2.



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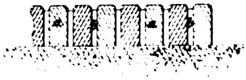
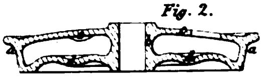


Eddy's imp^d wheels.

Fig. 2.



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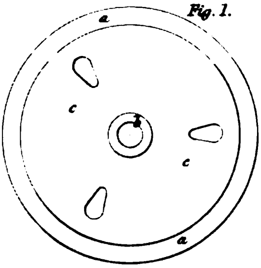

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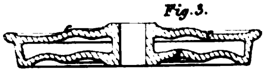
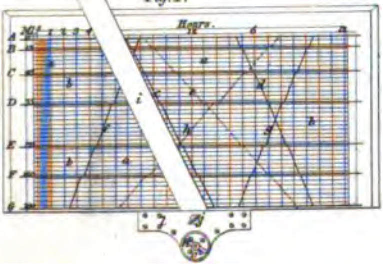


Ybry's railway indicator.

Fig. 1.



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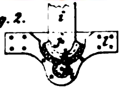

Maccarthy's imp^{ts} in anchors & fids.

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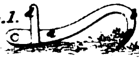

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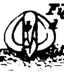

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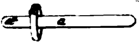

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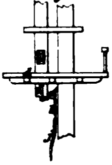

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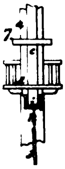

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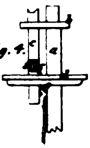

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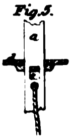

Taylor's imp^{ts} in boring tools.

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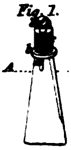

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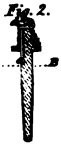

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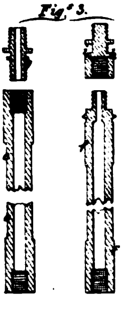

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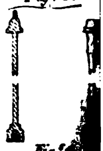
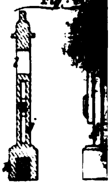


Fig^s



CONJOINED SERIES

Tatham, Cheetham & Duncans impts in preparing cotton.

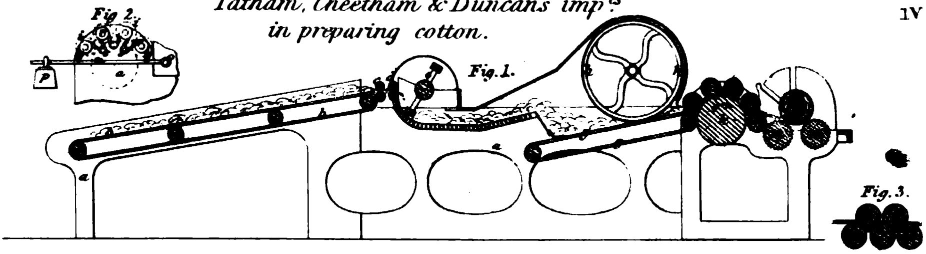


Fig 2.
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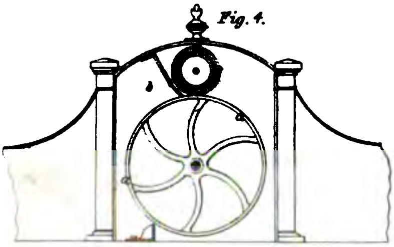
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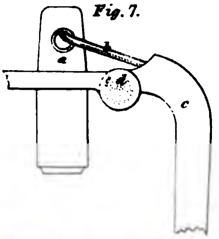
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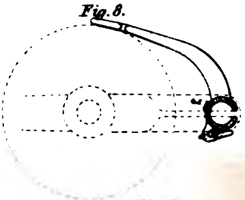
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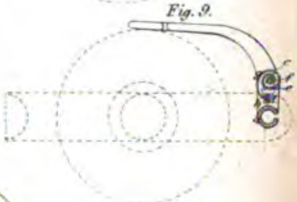
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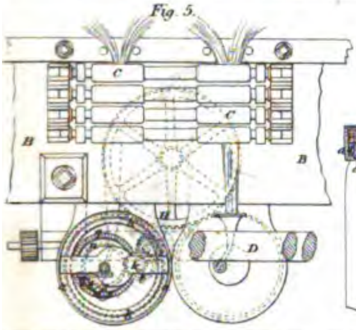
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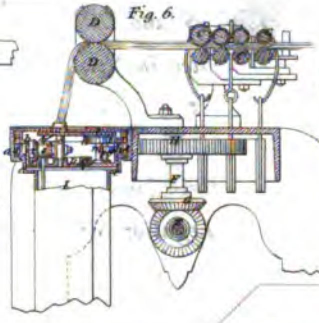
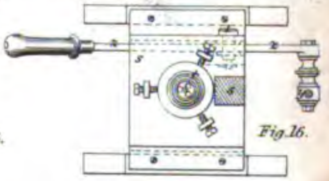


Fig. 6.

Ford's impts in making pottery ware.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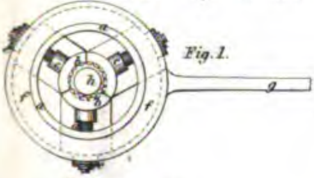
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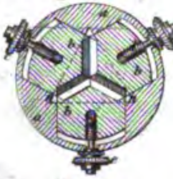
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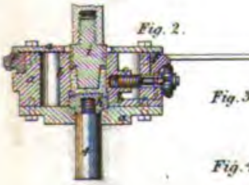
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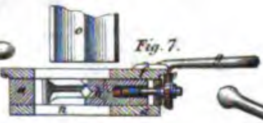
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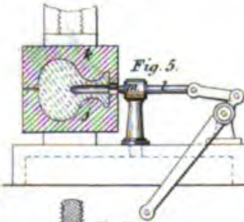
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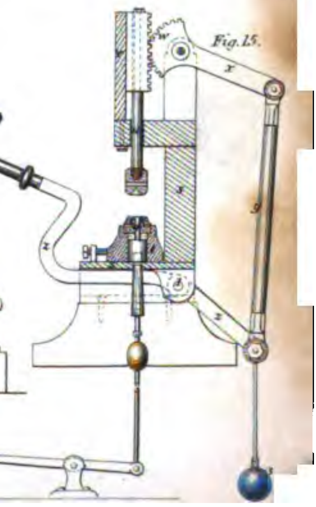


Fig. 15.

Figs 8.

Figs 10.

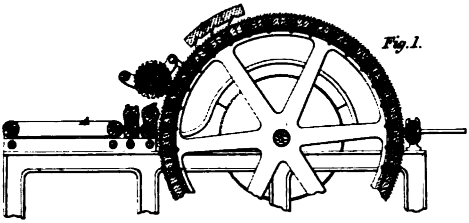
Figs 9.

Figs 11.

Fig. 13.

Fig. 14.

Fig. 12.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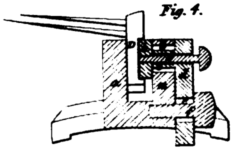
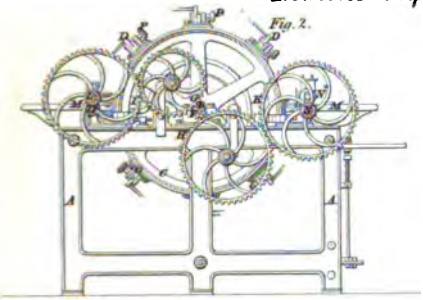


Fig. 4.

Newton's imp.ts in combing wool.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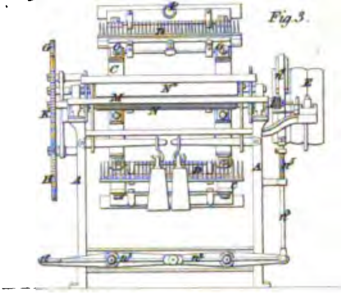
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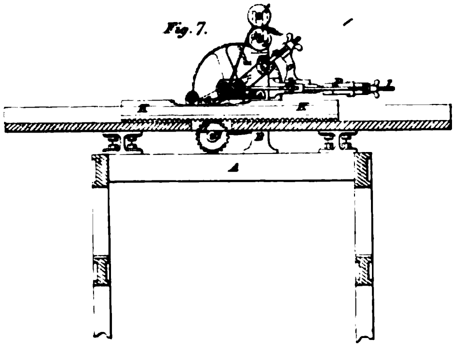
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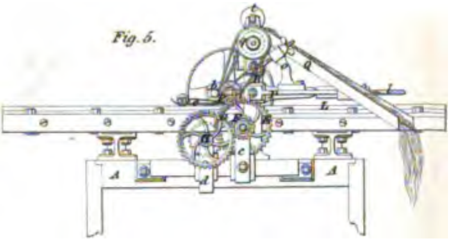


Fig. 5.

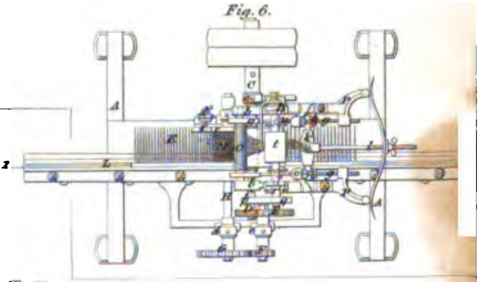
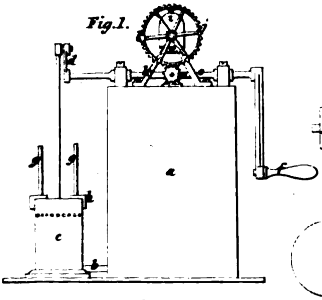


Fig. 6.

Doull's imp.d signal app.ts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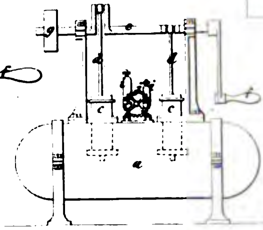
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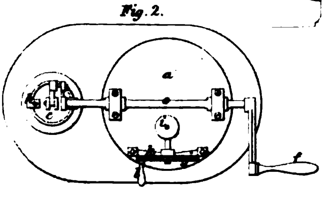
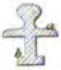


Fig. 2.

Hedge's imp.ts in rails.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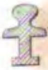
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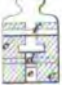
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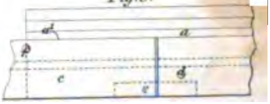
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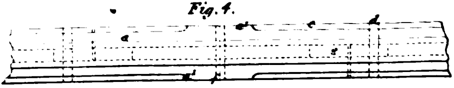
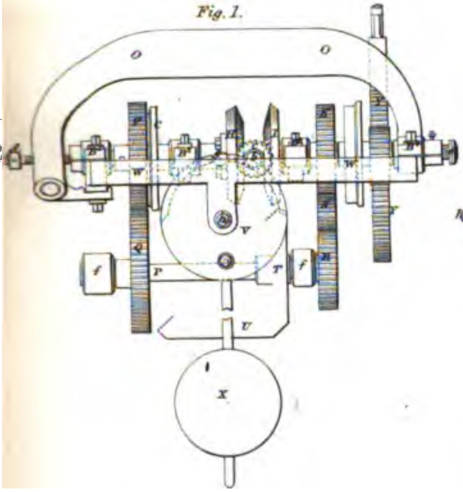


Fig. 4.

W A B

Fig. 1.



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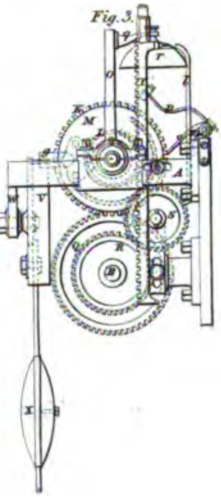

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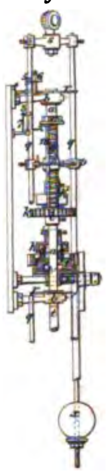

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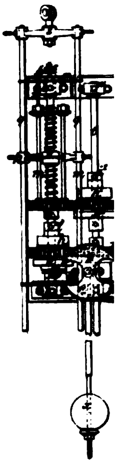


Perpigna's imp^{ts} in governors.

Fig. 2.

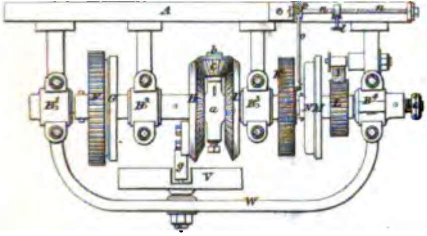
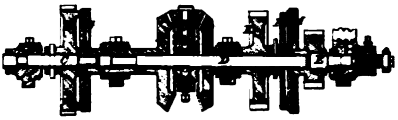


Fig. 4.



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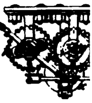

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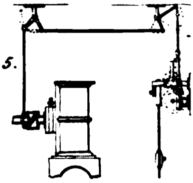


Grundy's imp^{ts} in furnaces.

Fig. 2.

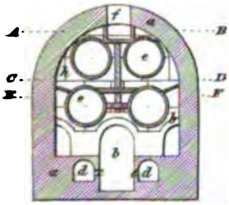
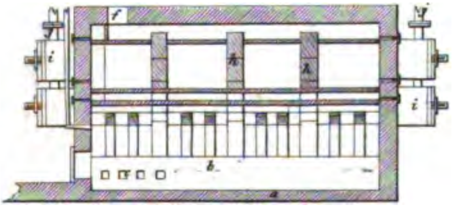


Fig. 1.



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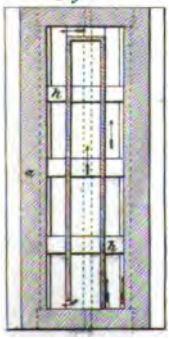

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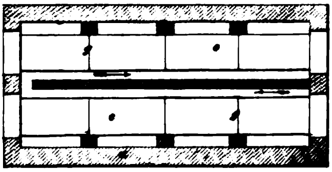

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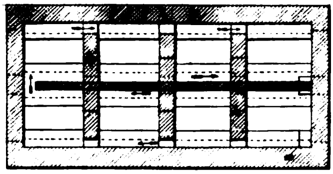
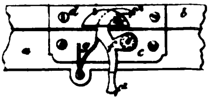


Loach's fastenings for windows, &c.

Fig. 1.



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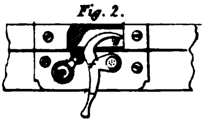

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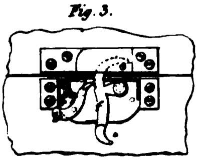
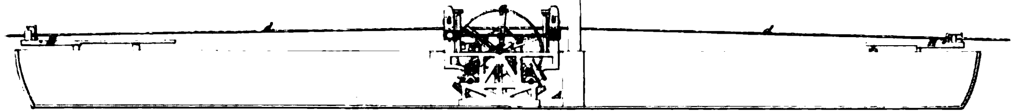


W. Newton del.

1st Sept^r 1847.

Beadon & Smith's imp^{ts} in warping.

Fig. 1.



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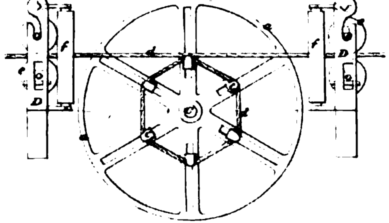

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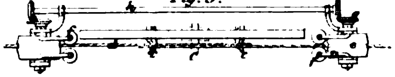

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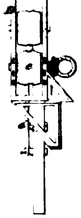

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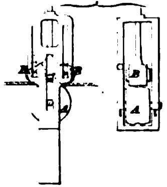
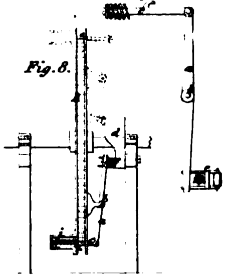


Fig. 8. Fig. 9.



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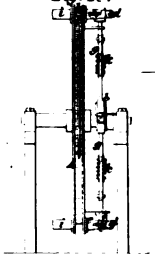

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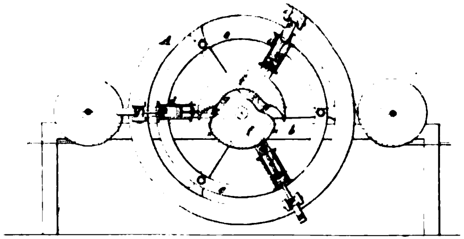

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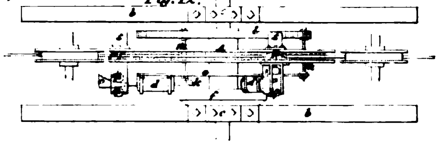
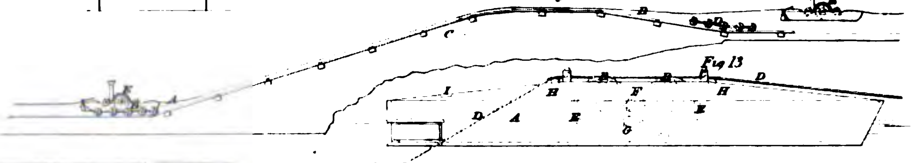


Fig. 14. Fig 13



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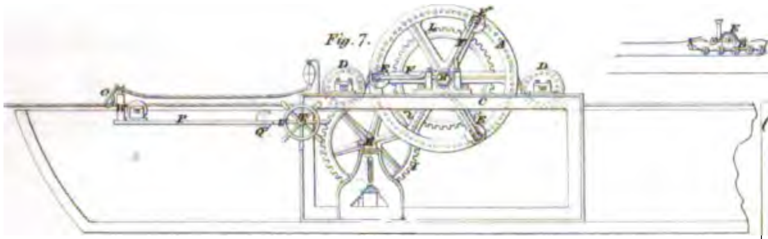

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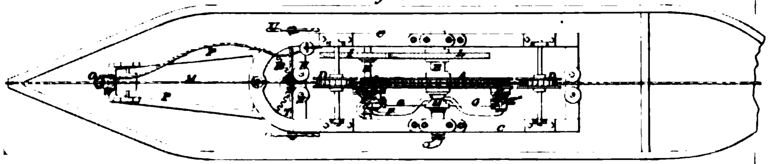
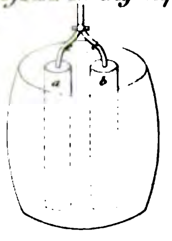


Croſse's treating liquids



Wright's imp^{ts} in obtaining light.

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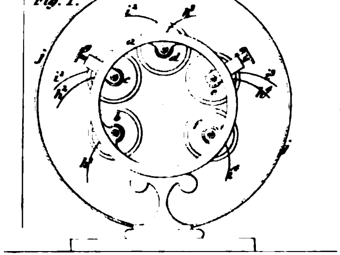

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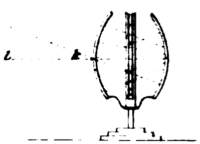

Beniowski's impts. in printing.

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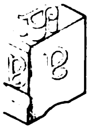

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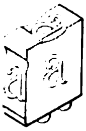

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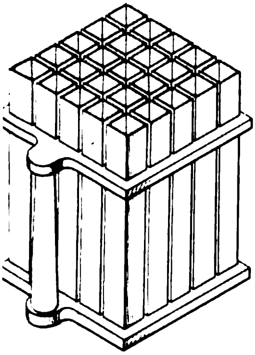

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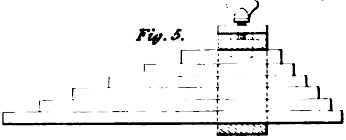

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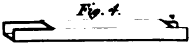

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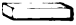

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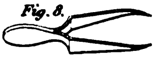

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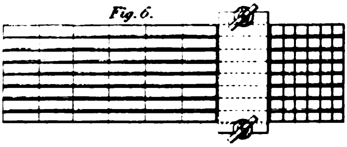

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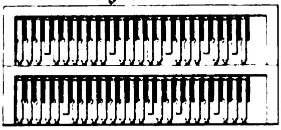

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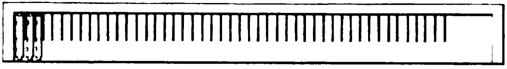
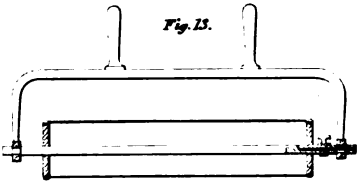


Fig. 10.

Fig. 13.



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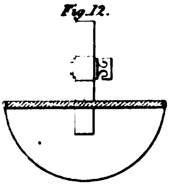
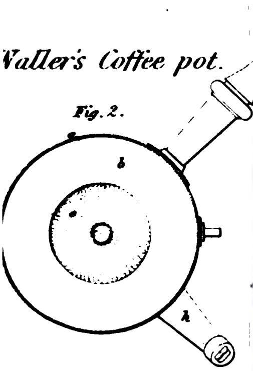


Waller's Coffee pot.

Fig. 2.



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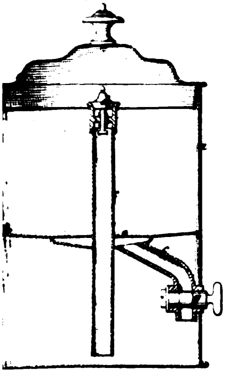
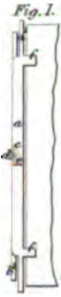


Hawkins' letter clips.

Fig. 1.



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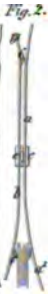

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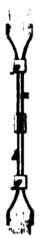

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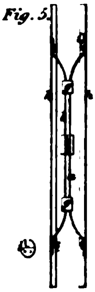

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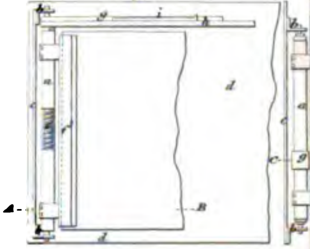

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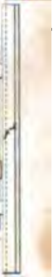

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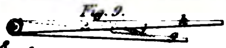

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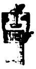

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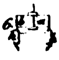

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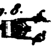

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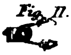
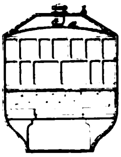


Duncan's impts. in omnibuses.

Fig. 2.



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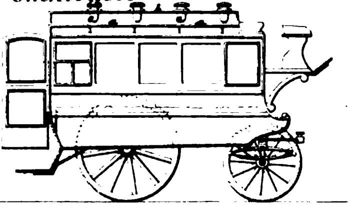

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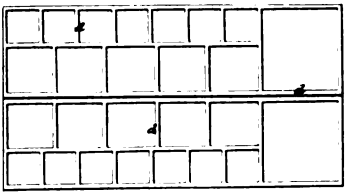
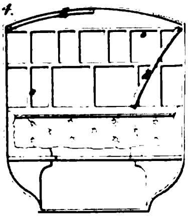


Fig. 4.



1st Octr 1847.

W.A.Beev

Perpignas's imp.ts in platting.

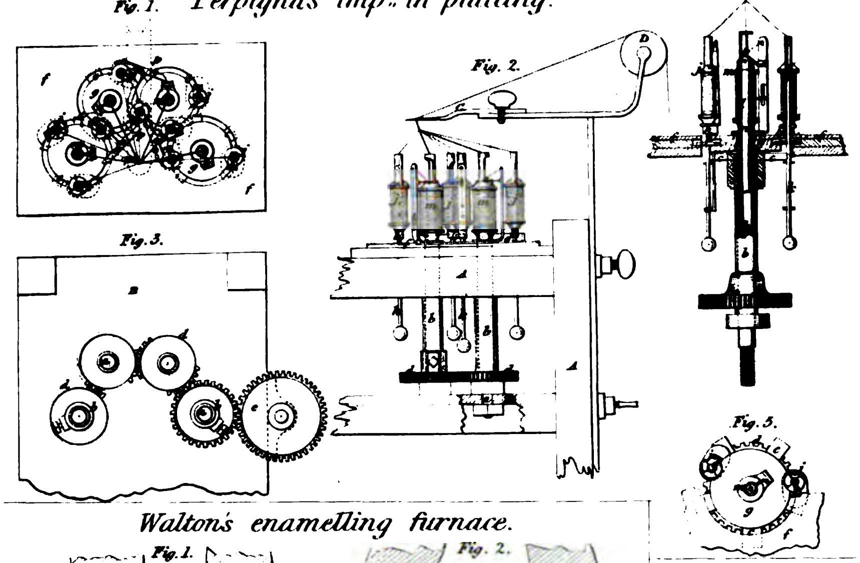


Fig. 1. Fig. 2. Fig. 3. Fig. 4. Fig. 5.

Norton's imp.ts in cranes.

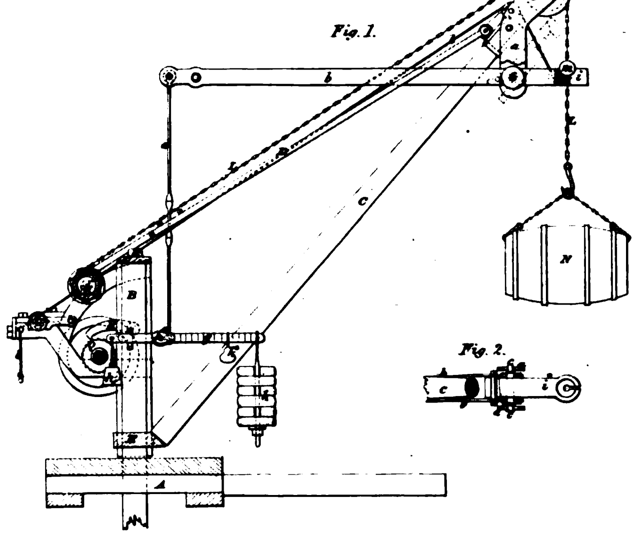


Fig. 1. Fig. 2.

Walton's enamelling furnace.

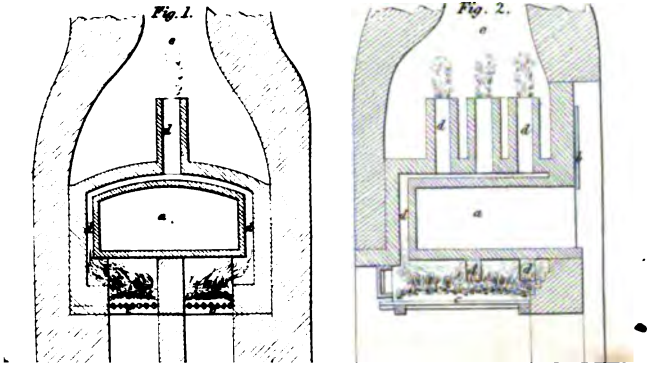


Fig. 1. Fig. 2.

Gedge's app.ts for moistening grain.

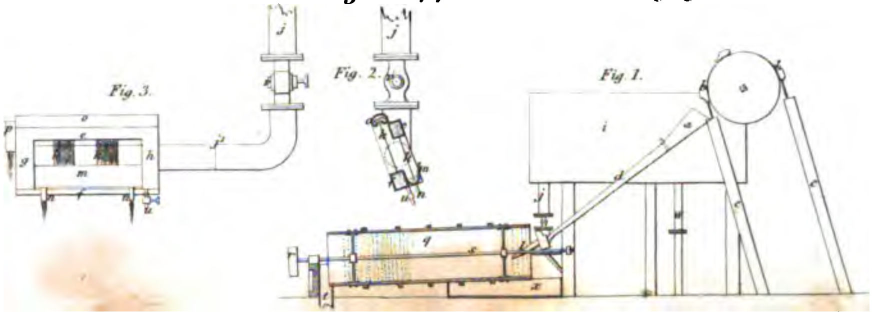
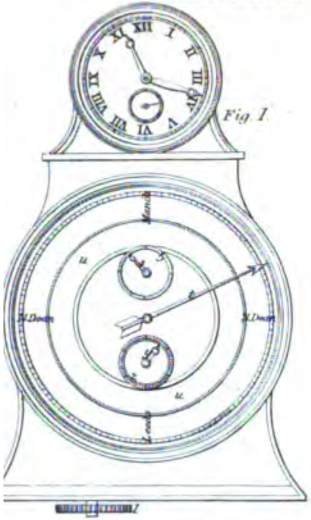


Fig. 3. Fig. 2. Fig. 1.

Fletcher's imp^d. railway indicator.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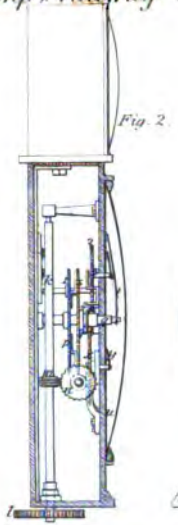
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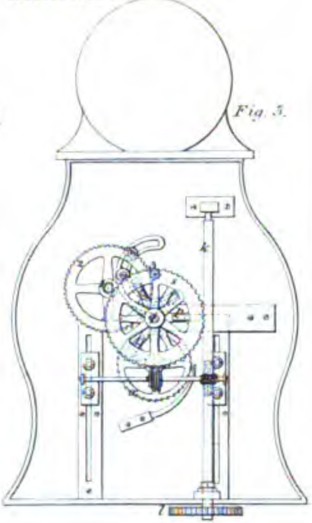
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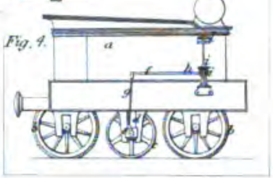
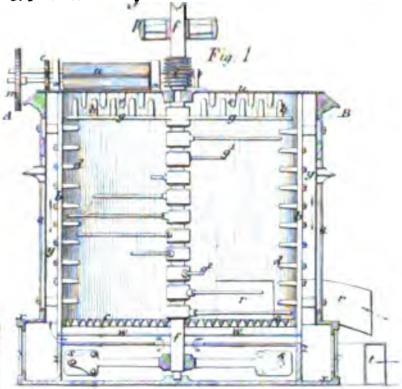


Fig. 4.

Hardacre's imp^s. in carding machines.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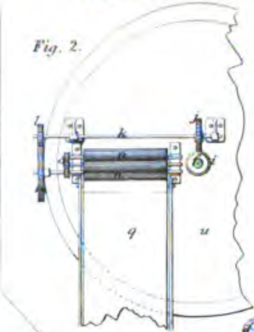
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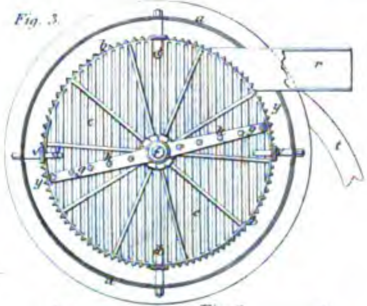
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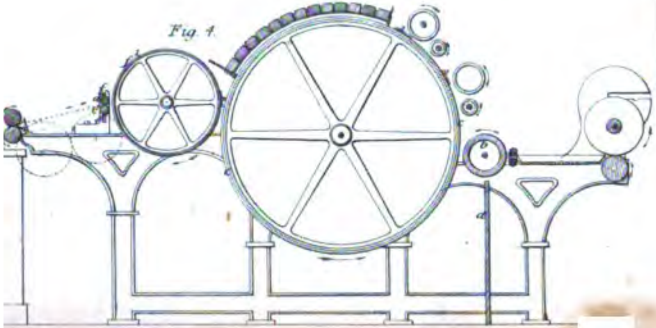
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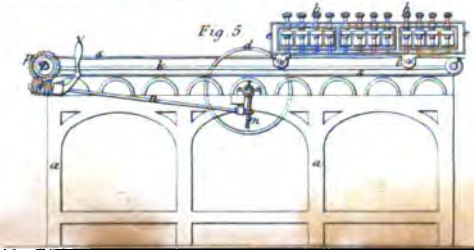
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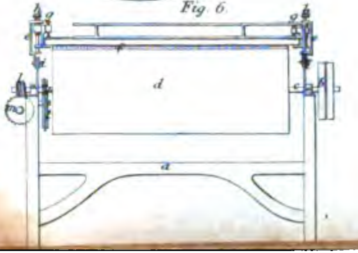
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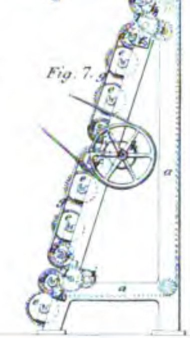
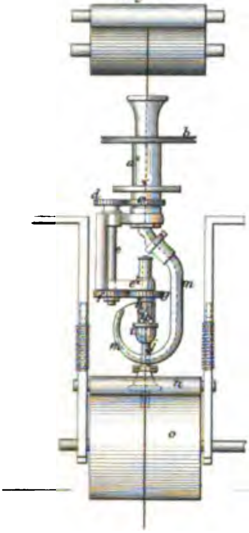


Fig. 7.

Eaton's imp^{ts}. in spinning.

Fig. 1.



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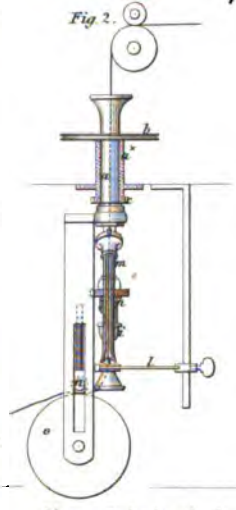

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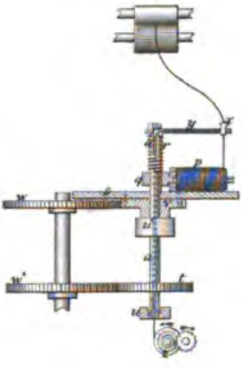

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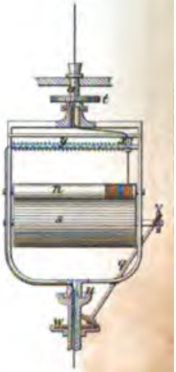

Fourdrinier's imp^{ts}. in printing.

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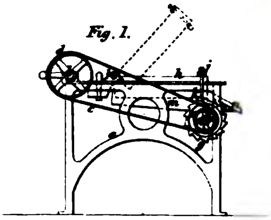

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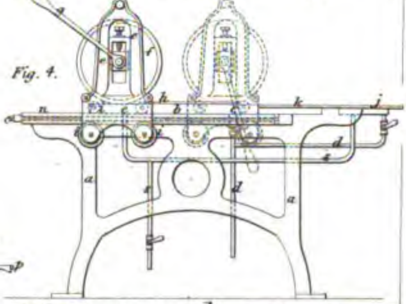

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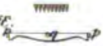

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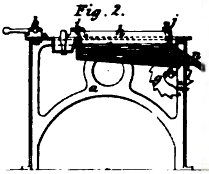
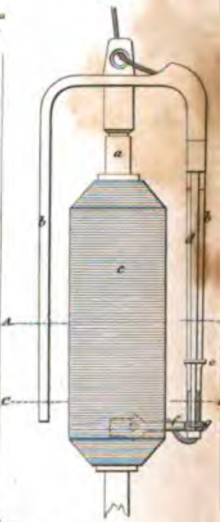


Warburton's imp

preſser-flyer.

Fig. 1.



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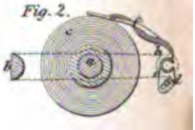

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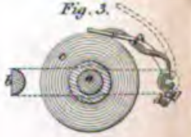
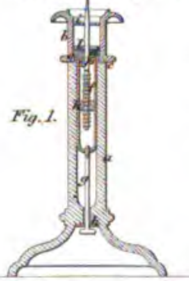


Keeling's imp^{d}. candlesticks.

Fig. 1.



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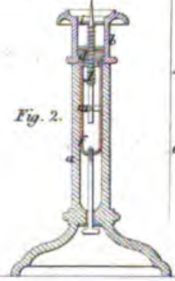
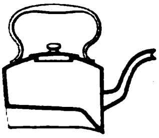


Skene's imp^{ts}. in obtaining infusions.

Fig. 1.



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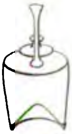

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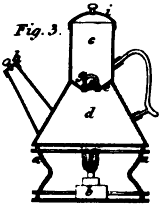
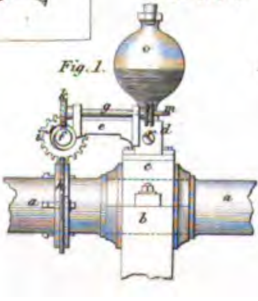


Carter's lubricator.

Fig. 1.



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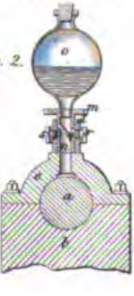
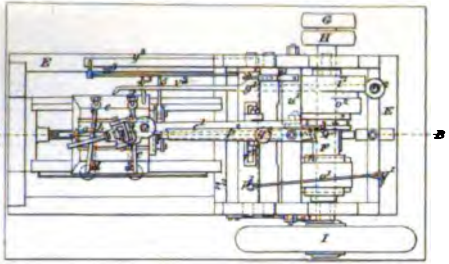


Fig. 1.



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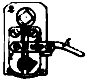

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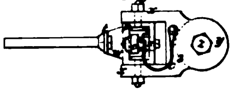

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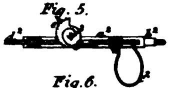

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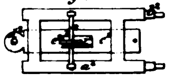

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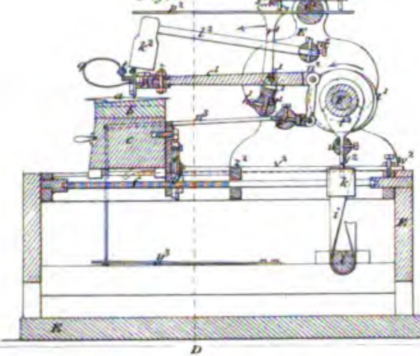

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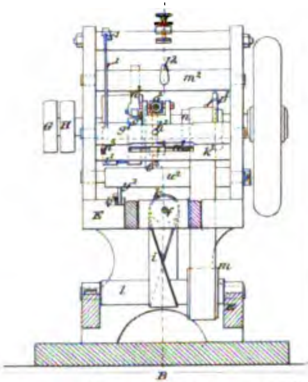

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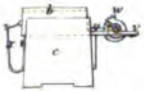

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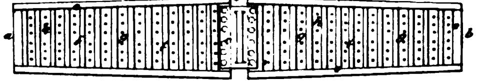

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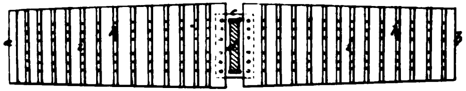

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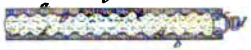

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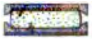
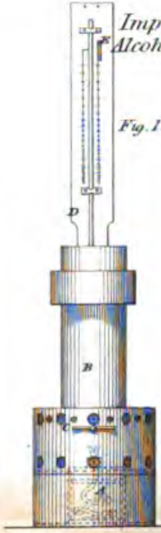


Improved Alcoholmeter

Fig. 1



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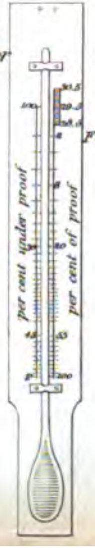

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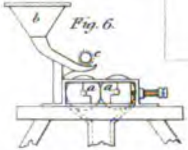


Snowden's app.ts for drefsing coffee.

Fig. 2.

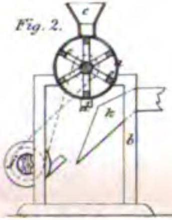
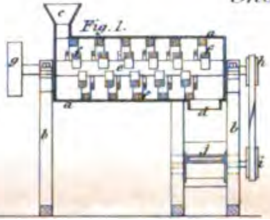


Fig. 1.



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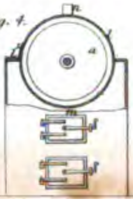

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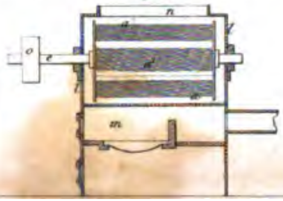

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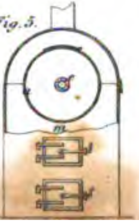


XIII

Wood's imp^{ts} in spinning

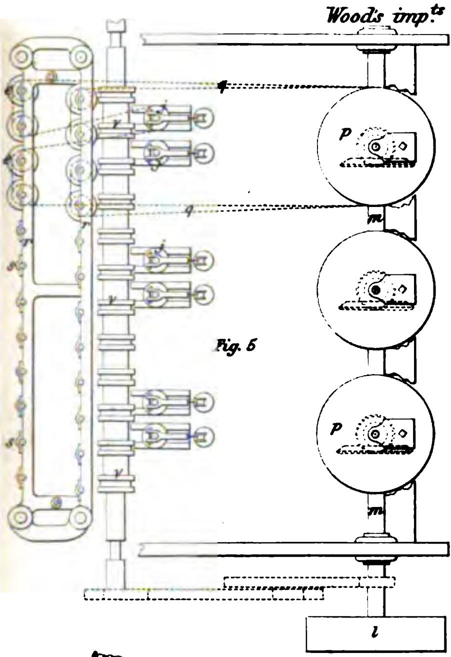


Fig. 5

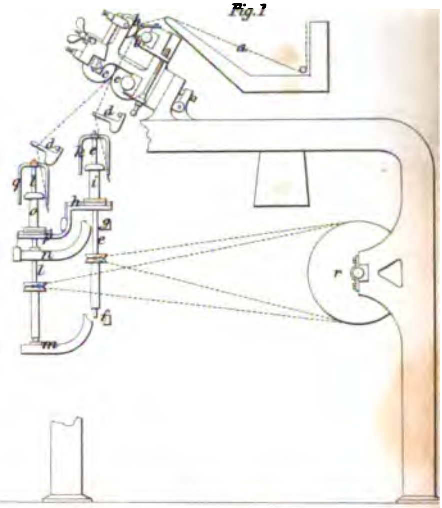
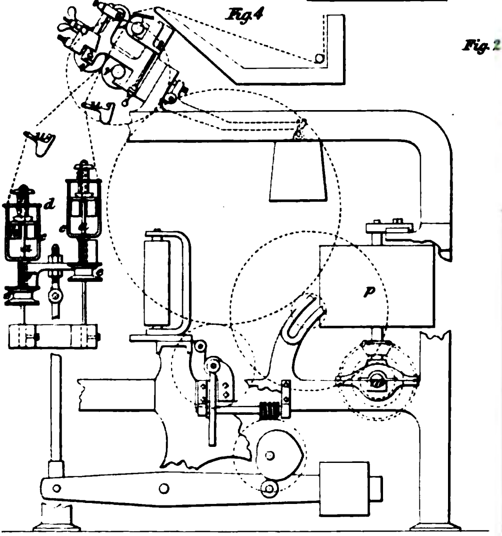


Fig. 1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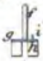
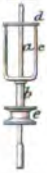


Fig. 3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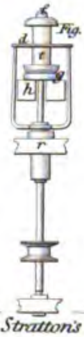
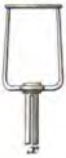


Fig. 8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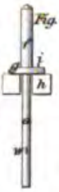
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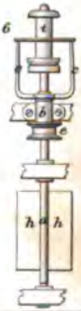


Fig

Stratton's imp^{ts} in making Wheels

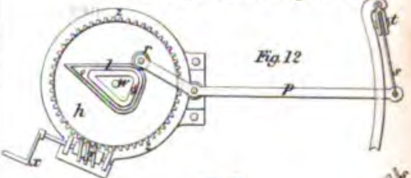


Fig. 12

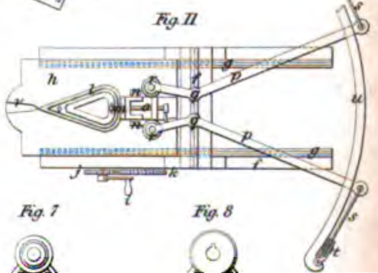


Fig. 11

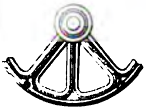


Fig. 7

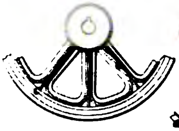
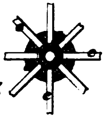


Fig. 8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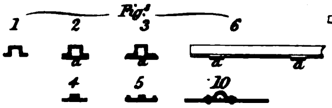
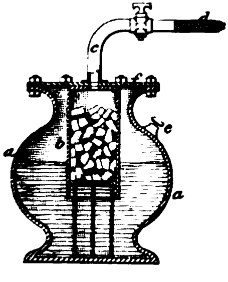
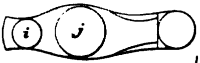


Fig.^{s}

yan's app^{ts} for preserving



Gray's imp^{d} Boots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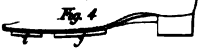


Fig. 4

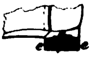


Fig. 1

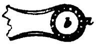
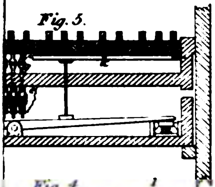
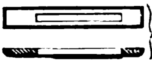


Fig. 2

PLATE XIV

Fig. 5.

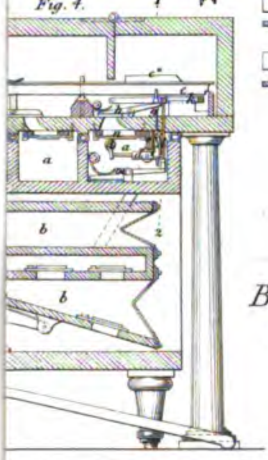



Figs 6.

Figs 7.

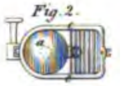
Figs 8.

Fig. 4.



Bagg's impts in illumination.

Fig. 2.



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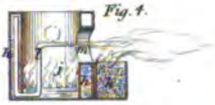

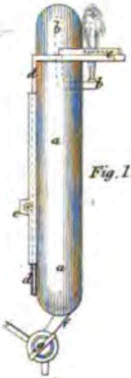

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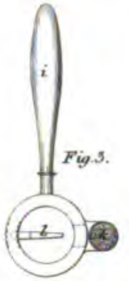


Fig. 5.

Atterbury's impd gearing.

Fig. 3.

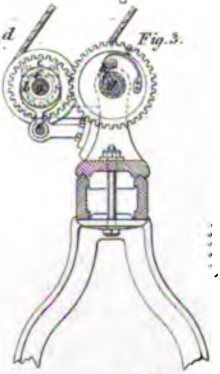
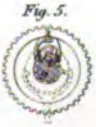
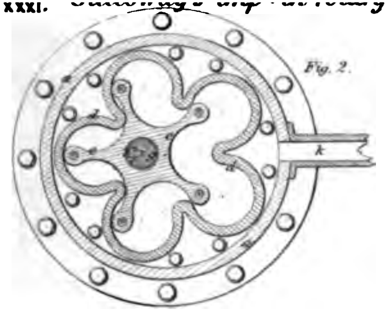


Fig. 5.



T. Sherratt sc.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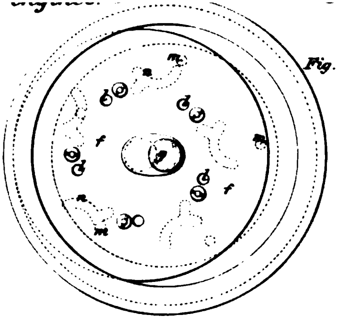
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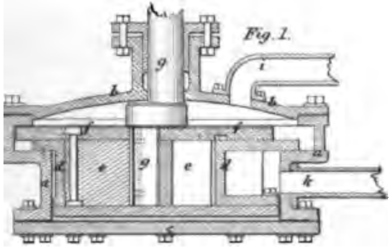
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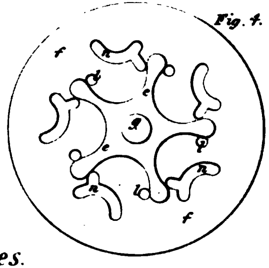
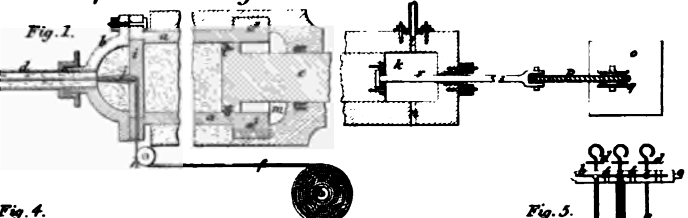


Fig. 4.

Allman's imp.ts in making candles.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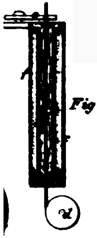
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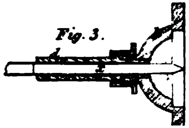
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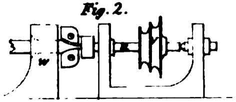
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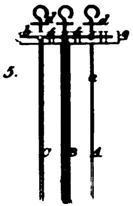
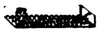


Fig. 5.

Debain's imp.ts in musical instruments.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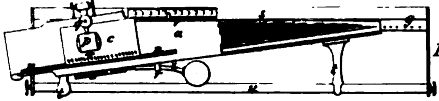
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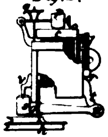
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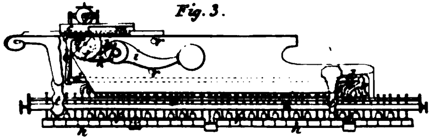
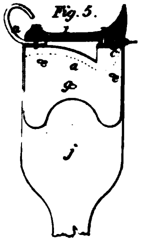


Fig. 3.

Hasluck's imp.ts in harneſs.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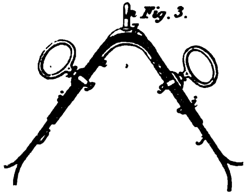
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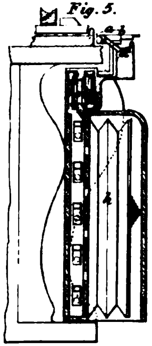
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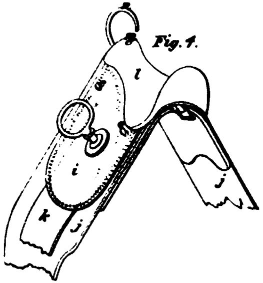
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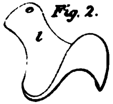
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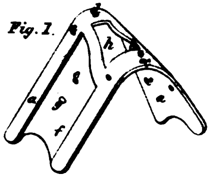


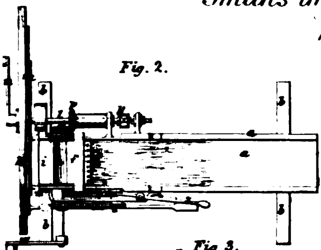
Fig. 1.

CONJOINED SERIES.

Smith's imp^ts in agricultural implements.

PLATE XVI

Fig. 2.



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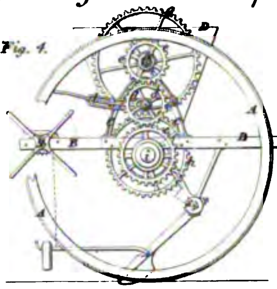

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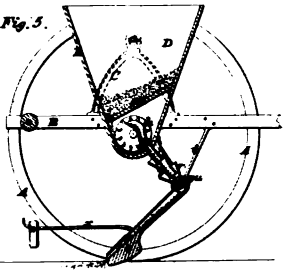

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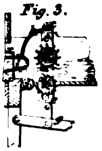

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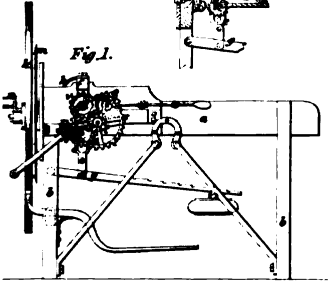

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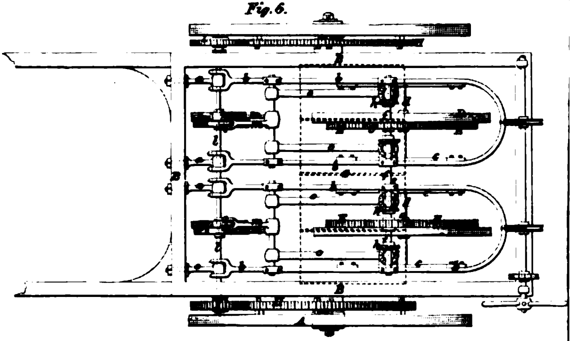
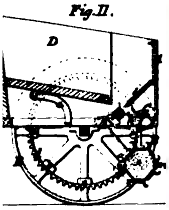


Fig. 12.

Fig. 11.



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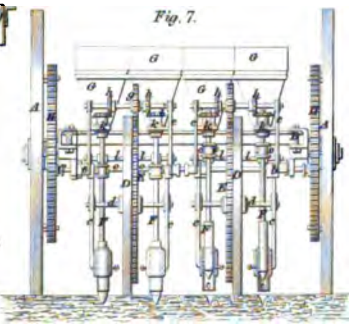

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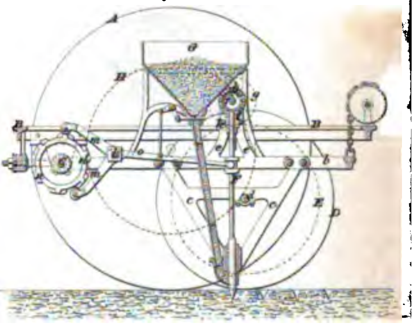

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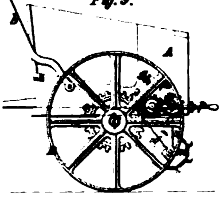
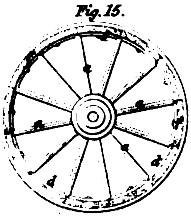


Fig. 16.

Fig. 15.



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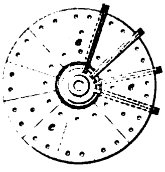

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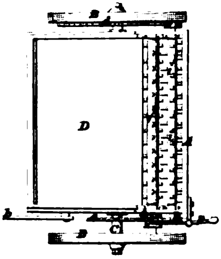


Fig^s.

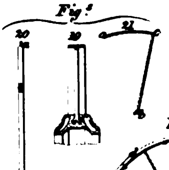
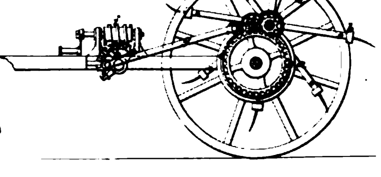


Fig. 14.

Fig. 13.



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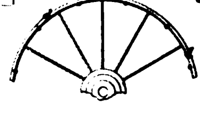
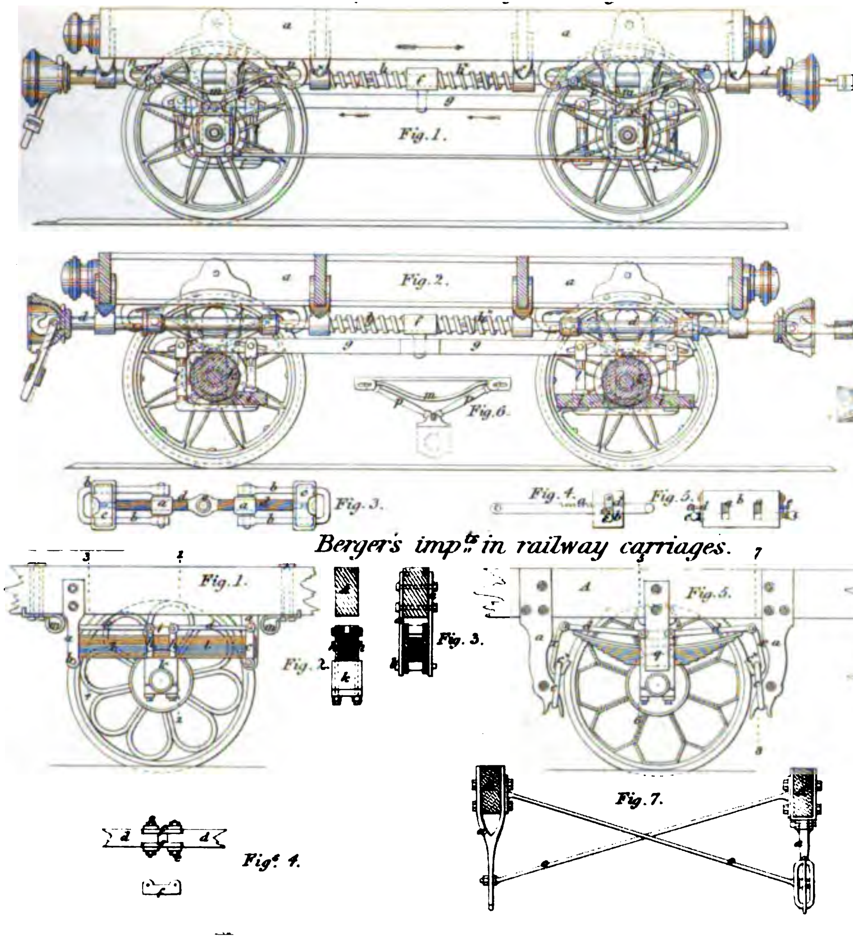
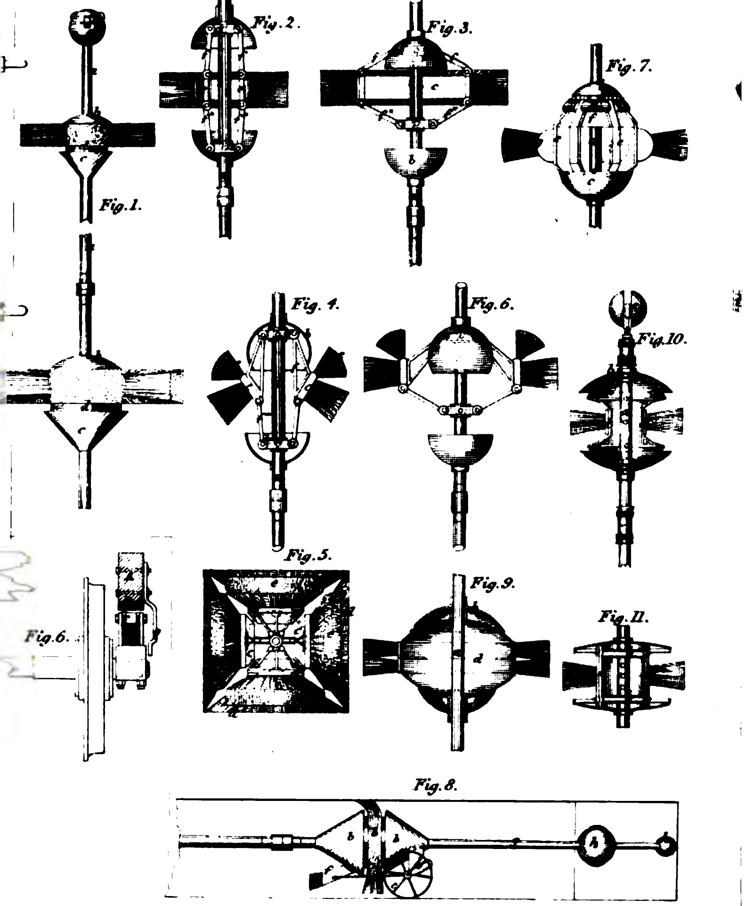


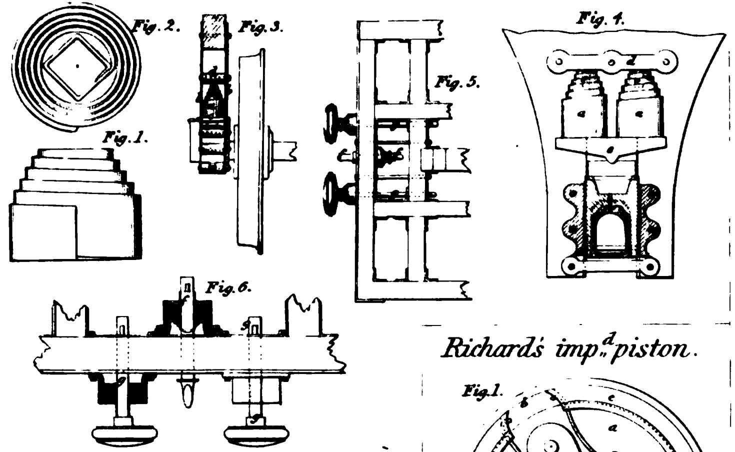


Berger's imp^ts in railway carriages.

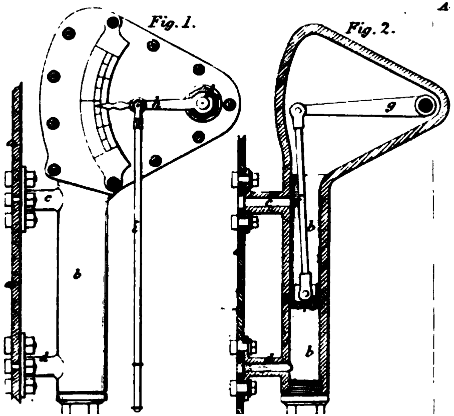


CONJOINED

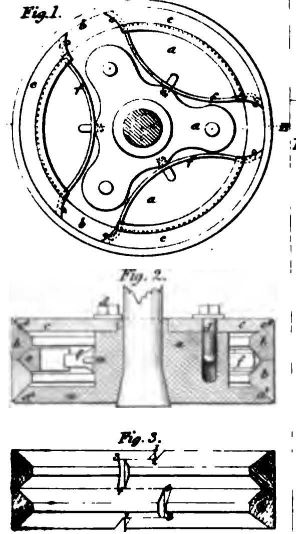
Wood's imp^{ts}. in carriage springs.

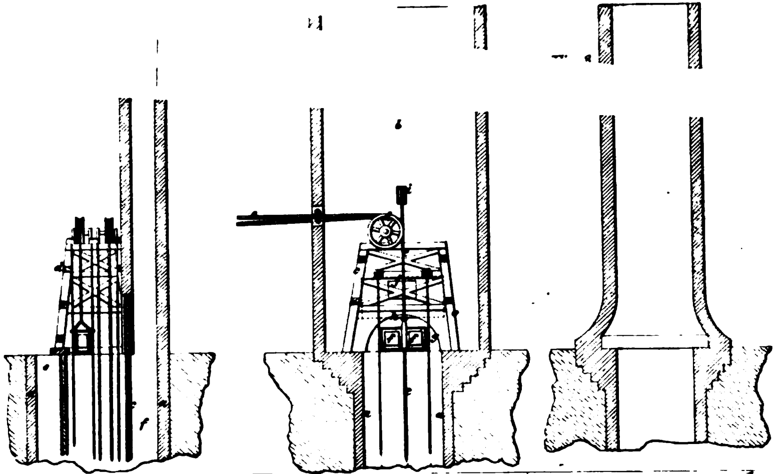


Newton's water gauge.

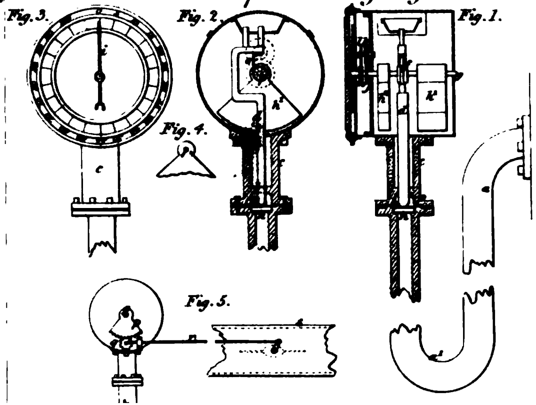


Richard's imp^{d}. piston.

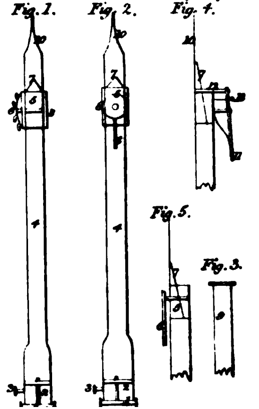




Smith's imp^{d}. steam gauge.



Hahnemann's imp^{d}. pen.



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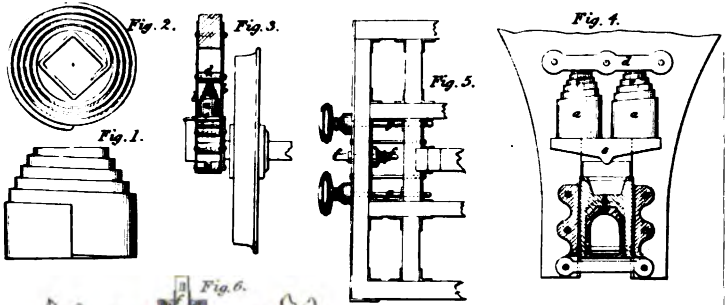
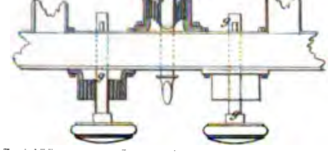
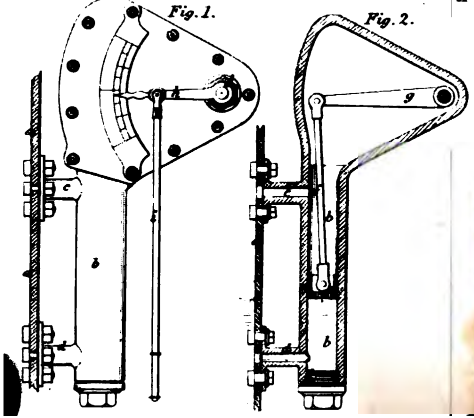
Wood's imp.ts in carriage springs.

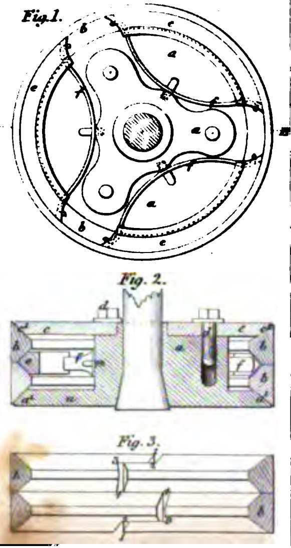




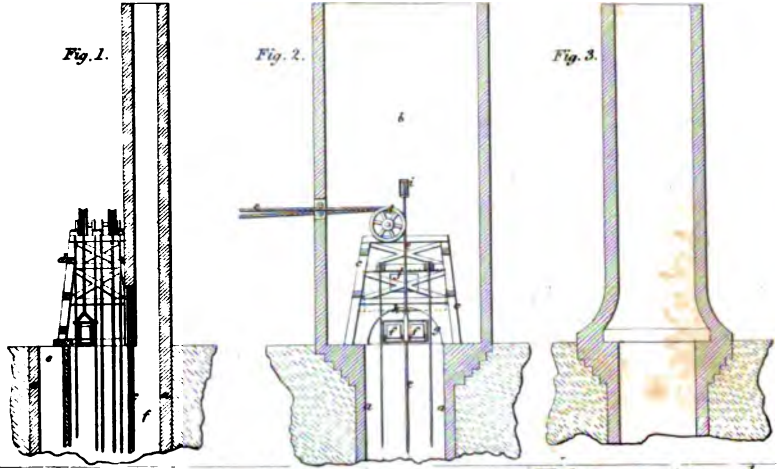
Newton's water gauge.



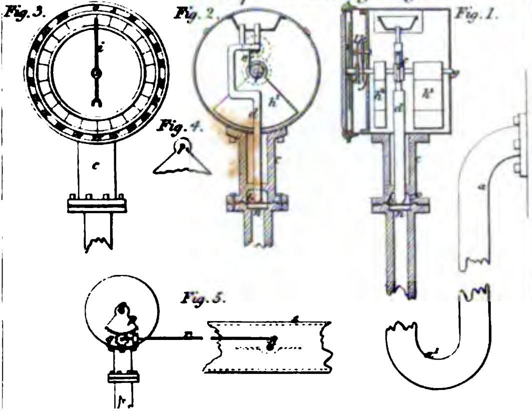
Richards' imp.d piston.



Wilcock's imp.ts in ventilating mines.



Smith's imp.d steam gauge.



Hahnemann's imp.d pen.